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THE BACTERIA OF THE SOIL WITH SPECIAL REFERENCE TO SOIL-INOCULATION.

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UP till about twenty years ago the soil was looked upon as made up merely of so many bits of dead material, stone and lime and clay, etc. Tillage was a mechanical operation, and changes that followed it were explained purely on chemical and physical grounds. In these last years, however, it has come to be recognised that the soil teems with myriad minute forms of life, useful and harmful and neutral; in a word, for the tiller of the ground the problem is not solely chemical, but biological. The biologist, in a more literal sense than the schoolmaster, is abroad in the land.

Many workers in soil bacteriology have given their attention to the exact numbers of germs present in the soil and in different layers of it. It would weary the reader to give lists of the numbers which vary in a gram (just over 15 grains) of earth according to the circumstances, from only a few up to some millions. Let me rather give the general principles determining their number as enunciated by Maggiora.* (1) The number of bacterial germs in otherwise resembling circumstances is in forest soils less than in arable land, and in this, less than in the soil of inhabited places. (2) In not cultivated soils the number of bacteria changes with (*a*) the geological formation and the height above the sea; (*b*) the imperviousness or a good æration of the soil, the germs being much less numerous in the former than in the latter; (*c*) with the nature of the soil. Sandy soil is less rich in bacteria than, say, humus soils. (3) In cultivated soils the number of germs increases with the culture, activity, and with the bringing of dung. Strongly dunged soils are much richer than poorly dunged or undunged The greatest bacterial richness is at a depth of 8 to 20 inches. Below this the

* Maggiora, "*Journal de la Agricole du Brabant*," 1888.

number quickly decreases. This is true for both cultivated and non-cultivated soils.

If I say that Kramer, as an average of three experiments with the same soil, found in a gram of earth

At a depth of about	8 inches	..	..	650,000	germs
" "	20 "	..	..	500,000	"
" "	28 "	..	..	276,000	"
" "	39 "	..	..	36,000	"
" "	47 "	..	..	5,600	"
" "	55 "	..	..	700	"
" "	64 "	..	..	only a few,	

perhaps it will be asked how is it possible to make such exact calculations? A survey of the methods will show the problem not to be as difficult as it seems. If the earth sample be taken from the upper layer of the soil, we do it directly with a sterilised spoon, and then place the sample in a sterilised tube plugged with cotton wool. If the sample falls to be taken from the deeper layers the above-mentioned method will not suffice, as in digging, the earth of the deeper layers will become mixed with parts from the upper layers which will tumble in. To obtain an accurate sample from a layer of any depth Frankel's borer is employed. The boring body of this instrument is about 1½ inches in diameter. An inch or two above the boring point is an opening between four and five inches long and about an inch deep. This opening is destined for the earth sample. The borer, with a handle which can be lengthened out to five feet, is pressed into the soil, and the mechanism is so arranged that as long as it is twisted from right to left the opening mentioned above as in the side remains closed. When the desired depth has been reached, by turning the borer in the opposite direction, the covering to the opening is pushed back and the opening exposed. The earth falls in, the opening is again closed, and the sample pulled up. One gramme of this earth is carefully weighed out and placed in a quart of water which has been sterilised by boiling, the mixture being thoroughly shaken. Meanwhile one has ready a glass tube containing the gelatine nourishing material for the bacteria. The gelatine has been rendered germ free by repeated heating in a steam bath. This gelatine, when liquefied by gentle warming, has added to it carefully by means of a sterilised pipette 1 ccm of the above mixture of water and earth. After a thorough mixing the entire contents are poured out of the tube on to a gelatine plate. Within a very short time the gelatine grows stiff and holds caught at certain points the organisms. The isolated bac-

teria begin to grow and multiply by fission and soon each has given rise to a colony. It is taken for granted that each colony has arisen from one individual germ, and by counting the colonies one gets the number of germs present in the 1 ccm of the earth mixed in the water, and can thus calculate the number in the quart, *i.e.*, in the gramme of earth. The colonies differ in external appearance and each is confined to members of the same species. To get a pure cultivation of a particular species one removes with a platinum needle a small part from a colony and inoculates a fresh gelatine tube. In general outline, then, this is the method, but in very exact work other points must be attended to, *e.g.*, certain bacteria only grow in absence of air (anærobic) and such must be cultivated accordingly. The questions of temperature and differences in nourishing media to suit the varying bacterial tastes must also be considered.

Bacteria generally.

Neglecting other microscopic forms and limiting ourselves to bacteria, let me briefly mention some of their characteristics. In distribution, these bacteria—which are droplets of protoplasm surrounded by a delicate cell-wall—are found everywhere—in earth, and air, and water. Our own bodies harbour scores of species. Owing to their small size, for long they escaped notice; and even yet, though armed with his microscope, the busy student is apt to grow despondent as he attempts to differentiate forms which, magnified 500 times, show as mere specks, and with even a 1,000 magnification, unless stained, give evidence of little structure. But "by their works ye shall know them;" for some act as scavengers, breaking down dead animal and plant matter; some are active in nitrification; some cause phosphorescence; some give rise to colours, and some to odours; to some we owe useful economic products the result of fermentation, while many cause direful diseases from the toxins and ptomaines which arise from their activities.

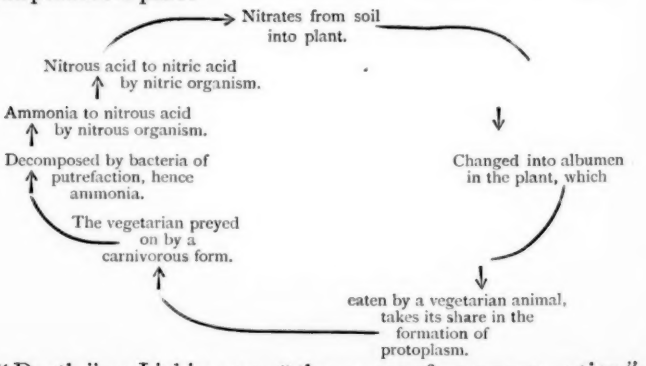
The forms of bacteria are very varied, but may be reduced to three types—the round, the rod-like, and the spiral, or to quote De Bary's happy illustration, "a billiard ball, a lead pencil, and a corkscrew."

Some of their relations to temperature and oxygen will be illustrated later. Some are active, others motionless. Reproduction is never sexual, but by fission when living in flourishing circumstances or by spores (and the spore stage is always a resistant stage) when the environment is unfavourable.

Bacteria of the Soil.—In the soil are a very large number of different species, some of which have been investigated and proved harmful or useful; but many more, as far as research has gone, have not yet been proved to have any significance as regards man himself or man's cultural operations. I propose to choose out of the mass three sorts, all of much importance to agriculturists, viz.:—

1. The putrefactive,
2. The nitrifying,
3. The nodule-forming bacteria of Leguminosæ.

There are a number of bacteria which act on nitrogenous organic compounds in the soil, which cause putrefaction, resolving the albuminous organic matter into simpler principles. We place as manure on our land complex organic substances which, by the aid of the putrefactive germs, are rendered simpler and brought into conditions such that they can be assimilated by the plant. When as a result of the action of the putrefactive bacteria on albumen, ammonia, say, is produced, this is seized and acted on by other organisms, the so-called nitrifying bacteria, the nitrous organism converting the ammonia into nitrous acid, the next step by the agency of the nitric organism being the formation of nitric acid, from whose union with a base come the nitrates, so important as the form in which plants obtain that nitrogen, without which their growth and development is impossible. There is, then, a sort of circle of changes by which the nitrates taken up by the plant once more find themselves as nitrates in the soil on the completion of the circuit in which bacteria play so important a part:—


Nitrates from soil into plant.
Changed into albumen in the plant, which
eaten by a vegetarian animal, takes its share in the formation of protoplasm.
The vegetarian preyed on by a carnivorous form.
Decomposed by bacteria of putrefaction, hence ammonia.
Ammonia to nitrous acid by nitrous organism.
Nitrous acid to nitric acid by nitric organism.

"Death," as Liebig says, "the source of a new generation," or, as Klein quotes, "from earth to earth."

Morphology of the nitrifying organisms.

Globular to begin with, but later oval and somewhat elongated. The nitrous organism is larger than the nitric, and measures $\frac{1}{25000}$ in.

Conditions which favour Nitrification with annotations.

1. *The presence of the organisms.*—These organisms vary in number greatly in different soils. The more highly cultivated soils will contain them in greatest quantity. Where they are poor in number, what has been termed "microbe-seeding" may be wisely practised—*i.e.* soils which, owing to their deficiency in these organisms, can be looked on as so far sterilised could have added to them soil which, from the conditions, was known to be rich in nitrifying germs. If the new environment were favourable, the introduced bacteria would rapidly multiply and spread. This is a favourable place to notice one of the values of stable manure. "Dung," as Hilltner has expressed it, "is the leaven of the agricultural soil," meaning that, in adding it, one gets over and above other well-known advantages a supply of vigorous nitrifying organisms.

2. *Access of Oxygen.*—This is why the bacteria of nitrification occur in greatest number towards the surface, and decrease with the depth. A new meaning is hereby given to tillage and good cultivation, as these ensure a good circulation of the necessary air.

3. *Light acts injuriously.*

4. *A certain moisture* is necessary, but marshy ground will lack the germs.

5. *A suitable temperature*, in this case, say, between 90° and 100°F.

6. *A base with which the nitric acid on its appearance can combine.*—As a matter of fact, a slightly alkaline medium favours the development of the germs. It is an interesting fact that, as a result of the activities of soil organisms, their own further development may be inhibited. Thus, as yeast is killed by excess of alcohol produced by itself, so, too, with bacteria. Their own products may forbid their further growth. In the world of medicine, by inoculation of the matter prejudicial to the life of certain bacteria, we can put an end to them. The presence of a base, then, prevents the accumulation of nitric acid. A favourite base is lime, and among the numerous advantages of lime in a soil, I desire at present to single out its favouring so largely the development of the nitrifying bacteria.

7. *The other necessary plant foods.*

And now there is a dark side to this story. All nature is at war, and it is useles to shut our eyes and cry "Peace," when there is no peace. Research has proved the presence in soils, of denitrifying organisms which may bring the work of the useful organisms to naught. Their work is a reducing one, the nitrates being decomposed with an ultimate giving off of free nitrogen. Instead of being a gain, these denitrifying bacteria occasion a loss. Generally, it may be stated that the conditions under which these harmful organisms flourish are the opposite to those we have mentioned as favouring the nitrifying germs.

The Bacteria of Leguminosæ.

Of the substances which are taken in by the roots of plants, the most important in plant metabolism, are the nitrogenous compounds. Generally it may be stated that while plants can and do take in oxygen as a free gas for their respiration, they are quite unable to make use of free nitrogen. The nitrogen, so necessary in the plant economy, can only be absorbed in the combined state, say, as nitrates.

For long this was held to be true of all orders of plants until it was noticed that while in soils deficient in nitrogen, most plants died away, yet, members of the order Leguminosæ (peas, clovers and vetches), grew quite well and left the land after their growth, richer in nitrogen than before. When it came to be admitted that leguminous plants must, and did make use of the free uncombined nitrogen, men cast about for an explanation of their advantage as regards nitrogen and several theories were advanced before it came to be admitted that in the nodule formation was to be found the real solution of the problem.

These warts, or swellings, or tubercles, as they are variously called, were shown to be little houses inside which lowly plant forms lived in partnership with the pea or bean or clover, deriving support from the plant and repaying this support by fixing the free nitrogen that surrounded the roots and forming it into compounds that were absorbed by the leguminous plant.

These swellings had been written of long before their real origin was described. As far back as 1687 I find Malpighi wrote of them as galls, and coming nearer to our own time they were looked upon by some as a sign of a diseased condition, and by others as resulting from nematode attack.

It was known that these nodules only appear on the roots in case of infection with a bacterium, the Bacillus radicicola of Beyerinck (*Rhizobium leguminosarum*. Frank). This bacillus is widely spread, and can be obtained in quantity for examination if perfectly fresh leguminous roots are laid in water and left to steep for a few hours in a warm room. Amidst the bacteria, which will have rendered the water cloudy, will be found many of the nodule making forms.

The bacteria penetrate a root hair or a noncuticularised epidermal cell (the young parts are the seat of infection, the older parts of the root not allowing an entrance), where they multiply at the expense of the cell contents. The irritation set up in the cortex cells, in which the bacteria ultimately find themselves, gives rise to repeated cell division, and the wart is formed. Finally, these bacteria take on a forked or Y-shaped appearance, when they are known as bacteroids. The full significance of these bacteroids will appear later, sufficient here to say that their contents are finally absorbed by the host plant. A certain number of bacteria remain behind, which, on the breaking down of the nodules, are set free again in the soil, where they may proceed to new infection.

Frank had previously noticed that nodules did not appear on leguminous plants grown in sterilised soil, but the proof that the Leguminosæ are not able to make use of the free nitrogen in absence of nodules, but only when nodules are present on their roots, was given by Hellriegel and Wilfarth after a series of very accurate recorded experiments. Their experiments showed that peas and lupins grown in soil sterilised, but with all the necessary plant foods added save nitrogen, died off without any nodule formation as soon as the original store of nitrogen present in the seeds had been exhausted. Peas and lupins, on the other hand, sown under the same conditions, save that a little soil was added from a field where peas and lupins had been growing the year before (in which soil it was reasonable to expect the infecting bacteria to be present) showed a large formation of nodules and a most excellent growth.

Many workers, British and foreign, have since verified these results, but Professor Nobbe and Dr. Hilltner, of Tharand, have taken a step in advance by being the first to induce nodule formation by inoculation with pure cultures. Here is the method of making such pure cultures. Take a fresh nodule and wash it carefully. After drying it in blotting paper, drop it for a moment into corrosive subli-

mate to kill any bacteria on the surface. Next wash it with absolute alcohol. Having sterilised a scalpel by heating in a flame, cut the nodule, dip a platinum needle into the cut surface, and streak the gelatine already prepared. It is well to have a large surface of gelatine, as the Bacillus radicicola is an ærobic form. It is important to remember that this bacillus will not grow on the ordinary gelatine, but there must be incorporated with the gelatine nourishing medium, a decoction of leguminous shoots or leaves. Having obtained in this way, after a few days, a pure growth of the bacillus, in order to inoculate plants growing in pots, some of the bacilli are transferred to water, a little of which may be sprinkled over the soil in which the plants are growing, or, better still, introduced by means of a glass tube to the deeper layers near the roots.

The experiments of Nobbe and Hilltner aimed at winning information and clearness in three directions, viz. : (1.) What are the true factors and occurrences by which a nodule-beset leguminous plant is able to make use of the free nitrogen ?

(2.) What is the action and efficacy of the nodules in soils holding different quantities of nitrogen ?

(3.) Are the bacteria from the warts of the different leguminous species one and the same species of bacterium, or has each leguminous group or species its own distinct nodule-former ?

As to question 1 : Some hold that the nitrogen assimilation is by means of the green leaves, others that the bacteria are the chief agents in taking up the free nitrogen. Nobbe and Hilltner believe strongly that the power is vested in the bacteroids which, arranged in the form of a network, expose a large surface to the air, to which the bacteroids come into relation as regards nitrogen in the same way as the gills of a fish to oxygen.

The conclusions from their experiments so far are:—(*a.*) Nodules whose bacteria have not followed on to the bacteroid stage (as happens in certain circumstances) are of no value to the plant, the bacteria in them being out-and-out parasites, and performing no nitrogen assimilation; (*b.*) The stronger in life the bacteria are, the less is the tendency to become bacteroids; the stronger the nodule-possessing plants, the easier is the changing from bacteria to bacteroids; (*c.*) With bacteroid formation comes nitrogen assimilation.

Question 2.—Hellriegel experimented with sterilised soil, and grew his plants with the conditions—no nitrogen and non-inoculated, and no nitrogen but inoculated. Of

greater complexity are the experiments of Nobbe and Hilltner, who added to some of the sterilised soils (left sterilised, or else re-inoculated) varying proportions of nitrogen, and noted results. Their answer to question 2 is, that the effect of the nodule reaches its full worth when the soluble nitrogen of the soil is almost used up by the growing plants. The more a soil contains of bound assimilable nitrogen, so much the later will the differences stand out externally between inoculated and non-inoculated plants. Quickly growing leguminous species like peas and vetches which sooner exhaust the supply of combined nitrogen, will show the effects of inoculation earlier than clover or lathyrus, which, growing at first more slowly, make more trifling demands on the soil nitrogen.

Question 3.—Do the bacteria from the nodules of different leguminous plants belong to one and the same species? Beyerinck is of opinion that the bacteria cultivated from the different species of Leguminosæ are not identical, though certainly very similar. He distinguishes two groups, I., those whose large colonies are more hyaline and give rise to bacteroids forked or roundish. Such are bean, vetch, broom, medicago, melilotus, clover, pea, lathyrus.

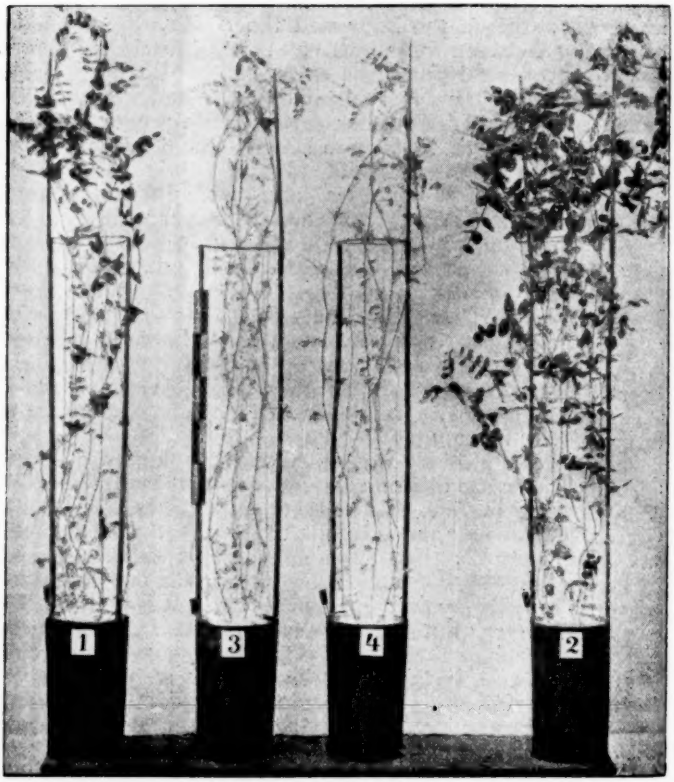
II., those with opaque, dull white colonies giving bacteroids seldom branched but more like bacteria, *e.g.*, ornithopus, lotus, lupinus, robinia, caragana.

Nobbe and Hilltner believe that though the bacteria springing from the different leguminous species can scarcely be distinguished from one another externally, yet in their effect and behaviour and attitude to the plants they show noteworthy differences. For example, bacteria cultivated from nodules on the pea, infect most powerfully other pea plants and act most beneficially on them; infect and act less favourably to plants not peas, but closely related to peas, and produce no impression on leguminous species like robinia or clover, whose affinity with the pea is not close. *Vice versa*, bacteria from the nodules of the red clover infect other red clover plants well, but are quite ineffectual on peas.

Nobbe and Hilltner, however, emphasise that the cultures from different Leguminosæ have not to be looked on as different bacterial species, but only as adaptable forms—forms adapted to the varying leguminous species by their living on different plants. To make this clear they have coined a new phrase. Neutral bacteria, viz., those living in the soil with no special biological adaptability to any special leguminous species, but able to get in a weak degree into symbiosis

(partnership) with all genera of Leguminosæ. These neutral bacteria having penetrated the roots of a special leguminous plant, form nodules. They multiply and their descendants become so influenced by the host plant that they cease to be neutral like the original parent forms, but effect their full

EXPERIMENT 1.



Pea (Pisum saltivum).
Inoculated with pure culture nodule bacteria of (1) Phaseolus, (3) Trifolium, (4) Robinia, (2) Pisum.

strength only on the same leguminous species at the same time losing their power to set up infection in any other. Here would be found the explanation of strange Leguminosæ forming nodulues on their roots, which nodules go on increas-

ing from year to year in number and efficacy. Leguminous plants, then, will only with certainty show nodule formation, if the soil contain either the germs accustomed to the planted species or else neutral germs.

I would now call attention to some experiments and photographs relating to question 2.

1. An experiment with pea (Pisum sativum).

In this experiment, 6 pots are taken and filled with a mixture of four parts quartz sand and one part garden earth, the whole being sterilised, *i.e.*, all germ life was killed by heating. In each pot 5 pea plants were sown in the beginning of June.

Pot 1 was inoculated with pure culture of Phaseolus bacteria.
" 2 " " " Pea "
" 3 " " " Clover "
" 4 " " " Robinia "
" 5 " " " Lupin "
" 6 was left uninoculated.

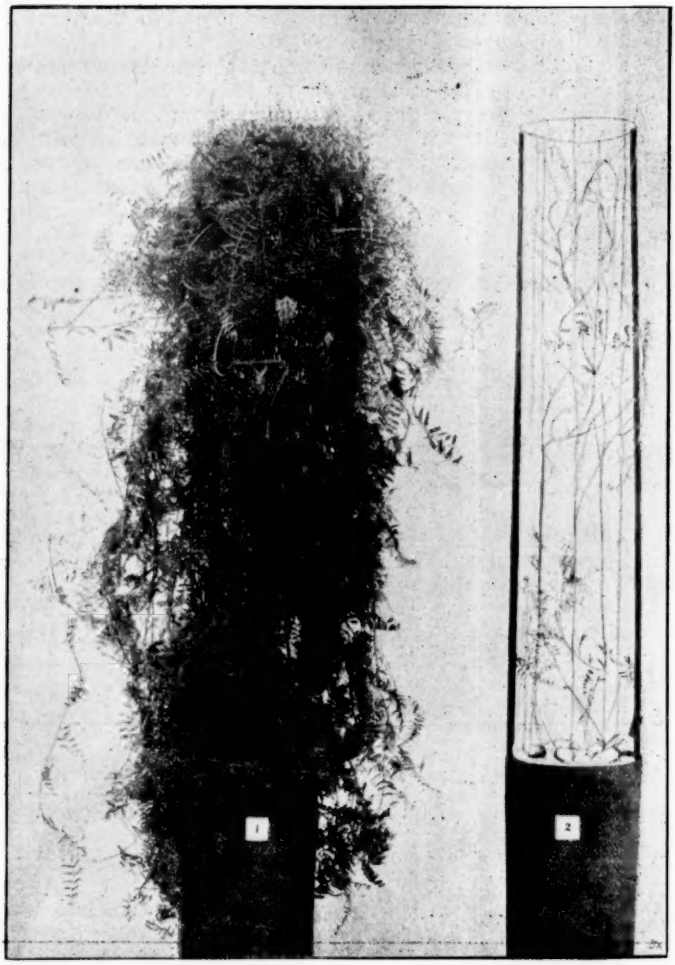
At first all the pots showed an equally good growth, but as time went on and the soluble nitrogen of the soil had been largely consumed, the effects of inoculation began to show themselves. The plants in the pot inoculated with phaseolus bacteria were seen to be green, and were richly flowering and fruit-bearing up till the autumn. The plants in the other four pots were quite withered by the end of August.

On October 20th the plants were cut and the above ground parts analysed. For comparison, here are the results in the cases of the uninoculated, inoculated with pea and inoculated with phaseolus.

	Not inoculated.	Inoculated with Phaseolus.	Inoculated with Peas.
Dry substance in gr. ..	3·878	28·821	95·452
N. in the green substance in gr.	0·055	0·852	2·791
N. in per cent. of dry substance	1·43	2.96	2·92

i.e., the plants inoculated with pea bacteria, compared with the not inoculated, showed 24 times more of dry substance and 50 times as much nitrogen contents.

EXPERIMENT 2.



Vetch (Vicia villosa).

(1) Inoculated with pure culture of nodule bacteria from Pisum sativum, (2) not inoculated.

At the time of cutting the plants had for each experimental pot :—

	Flowers still blooming.	Fruits.	Seed.
1. Inoculated with phaseolus bacteria	18	41 (20 still unripe)	55
2. Inoculated with pea bacteria	36	134 (77 still unripe)	161
3. Not inoculated	0	2	3

Experiment 2 with Vicia villosa.—This experiment was conducted under the same conditions as the last, only the pots contained Vicia villosa plants instead of peas.

The most noteworthy thing about this experiment was that the best results were given with the vetch plants in the pot inoculated with pea bacteria (vetches and peas are nearly related), and the next best results in the case inoculated with phaseolus bacteria. The plants inoculated with clover, robinia, lupin soon began to show nitrogen hunger, shedding their leaves. The non-inoculated plant was ultimately quite leafless :—

	Uninoculated.	Inoculated with Phaseolus bacteria.	Inoculated with Pea bacteria.
Dry substance in gr. ..	4·292	63·929	93·693
N. in green substance in gr.	0·070	2·310	3·444
N. in per cent. of dry substances	1·84	3·61	3·68

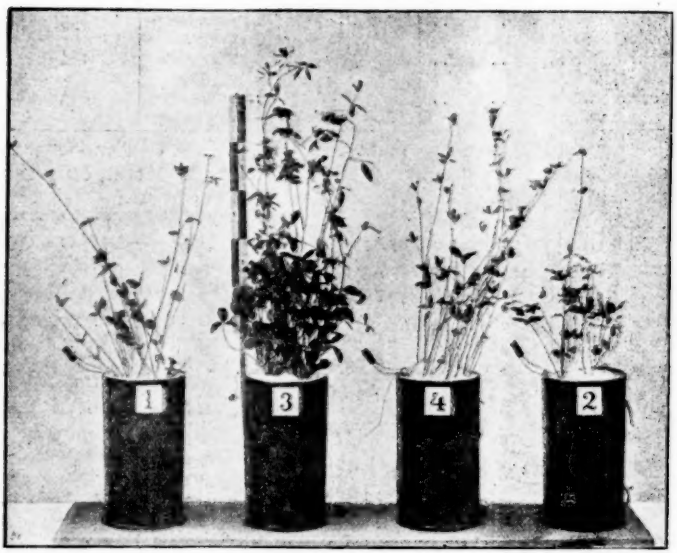
Experiment 3 contains additional interest. The plants experimented with this time were red clover, five in each pot and all the conditions of the other experiments the same. In this experiment the inoculations with pea bacteria, with robinia bacteria, and with lupin bacteria, showed in the first two no effect whatever, and with the lupin only a very limited effect.

Comparing the pea inoculation with the clover inoculation :—

	Inoculated with Pea bacteria.	Inoculated with Clover bacteria.
Dry substance in gr.	6·23	70·99
N. in green substance in gr.	0·108	2·136
N. in per cent. of dry substance ..	1·74	3·01

As to flowers and fruit. In cutting in October, the five clover plants inoculated with clover bacteria had had 54 flower-heads, while the pot inoculated with pea had only eight flower-heads.

EXPERIMENT 3.



Red clover (Trifolium pratense).
Inoculated with pure culture of nodule bacteria from (1) Phaseolus, (3) Trifolium, (4) Robinia, (2) Pisum.

The 4th experiment will have an interest for Foresters. Robinia plants were inoculated, some with pea bacteria and some with robinia bacteria. The robinias inoculated with robinia bacteria greatly excelled the robinias inoculated with pea bacteria.

So far for laboratory experiments with sterilised soil. There has not yet been time to obtain many results from experiments made with pure culture inoculation on a field scale, but yet here, too, we have an earnest of success.

Three plots out in the open, each 120 yards square, were planted with ornithopus. The sowing was in May.

The photographs I owe to the kindness of Dr. Hilltner. They originally appeared in the "Landw. Versuchs Stationen," Bd. xlvii., published by Paul Parey, Berlin.

Plot 1 was inoculated with pure culture of ornithopus bacteria.

Plot 2 was inoculated with raw earth from another ornithopus field.

Plot 3 was left uninoculated.

When these plants were revised in August, the non-inoculated plot averaged 2 small nodules per root; the inoculated with raw soil plot averaged 3 medium-sized nodules per root; the inoculated with pure ornithopus culture averaged 9 mostly large nodules per root.

Many experiments on a field scale have been started on the Continent, and, doubtless, during the year many more will be undertaken in Britain. Certainly a good case has been made out in the experiments in the Experimental Station at Tharand, for the value of Soil Inoculation, and new field experiments under many conditions, must give the final answer as to whether or no this special branch of Soil Inoculation is likely to prove advantageous.

As to Methods.—Where a soil is deficient in Bacillus radicicola, there are two methods of infection :—

1st. The bringing to such a field a quantity of soil from another field on which the species of the plant to be sown has already grown well. This soil is then worked in. Dr. Salfeld, of Hanover, holds the honour of having employed this method on a large scale with gratifying results, getting good leguminous crops where such had refused to grow before.

Difficulties in the way of using this method of inoculation on a large scale will occur, *e.g.*, uncertainty, questions of cost and transit, the possible introduction of harmful forms, and so on.

There remains the second method, viz., Nobbe and Hilltner's method of. inoculation with pure cultures. Such cultures can be made by onesself if the necessary bacteriological training is possessed, but if not, flasks containing the cultures can be brought from Lucius and Brüning, Hoechst a/Main, at 2s. 6d. each. So far cultivations of the following plants can be procured :—

Trifolium pratense, or repens, or hybridum; Trifolium incarnatum: Vicia villosa and sativa; Pisum sativum; Vicia faba; Medicago sativa; Medicago lupulina; Lupinus luteus; Lupinus augustifolius; Ornithopus sativus; Onobrychis sativa; Lathyrus sylvestris.

Each such bottle contains enough to supply half an acre.

In the inoculation with pure cultures there are two varia-

tions. (*a.*) *The inoculation with infected soil.*—Take one of the above-mentioned bottles, gently warm the bottle by placing it in lukewarm water (great care must be taken not to over heat; keeping in one's pocket for a few minutes is enough), and the gelatine with the culture is liquified. Pour this (thoroughly cleaning the bottle out) into a vessel containing sufficient water to moisten half a hundredweight of soil. Mix this liquid well with the earth, then add some dry soil till a condition is reached, when it can be conveniently spread. Work this into the field to a depth of 3 to 4 inches. Sow as soon as possible.

(*b.*) *The inoculation of the seed directly.*—As before, take a bottle and pour the liquefied contents into 1½ pints of water (this will do for small seeds like clovers, but for large seeds use 2 or 3 quarts). Pour the mixture over the seeds, and mix thoroughly, making sure that each seed gets moistened. Then add some soil from the field to be sown, so that the seeds do not stick together in clumps. Mix, and when dry enough, sow.

In both (*a*) and (*b*), I have given the quantities necessary to inoculate ½ an rcre.

Hints as to Experiments.

To all intending to make experiment, I would recommend that in each experiment, for purposes of comparison, three plots be dealt with. Let Plot 1 remain uninoculated; let Plot 2 be inoculated with infected soil; let Plot 3 have the seed inoculated directly. In the case of experiment on these lines, for safety let the uninoculated plot be sown before the inoculated, and to prevent after infection, let great care be taken to have no traffic between the inoculated and the non-inoculated plots.

Experimenters will also note—

(1) That the cultures are very sensitive to light, and heat, and drought, all of which destroy the efficacy of the bacteria. Therefore, do not allow the inoculated soil or seed to become too dry, and do not allow the seeds to remain exposed on the surface.

(2) The results of inoculation must not be looked for too early. Remember that the efficacy of the nodules only comes into full activity when the soil nitrogen has been used up. The more of this in the soil the later will the effects of inoculation show themselves.

(3) In order that a proper judgment be passed as to the effect of inoculation in parallel experiments, a mere naked

eye overlook is not sufficient and not trustworthy. There must follow a careful weighing.

Dr. Hilltner told me of a case where Dr. Salfeld made an experiment with ornithopus, the pure cultures for which were supplied from Tharand. When towards the end of the experiment an inspection was made, there seemed, as far as the eye could judge, to be no difference between the inoculated field and the non-inoculated, and as the plants on the latter also showed nodules, everyone thought this experiment had proved a failure. Just eight days after the inspection, the two crops having been cut in the interval, Dr. Salfeld wrote to Professor Nobbe to the effect that the inoculated plot had borne stronger plants than the non-inoculated, and that a careful weighing had given a 25 per cent. advantage in green substance to the inoculated over the non-inoculated.

(4.) It must not be forgotten—that the condition of the soil has a most important influence on the results of inoculation. The—apart from nitrogen—necessary plant foods must be present in sufficient quantity. The nodules collect only nitrogen, so that the plants must find in the soil all the other foods. A chain has only the strength of its weakest link, and "a field is as poor as its most deficient fertilising principle." Apart from nitrogen, if there be only one of the other necessary foods not present in sufficient amount, then the capacity of the nodules will fail from the time when this substance begins to disappear.

(5.) The most profitable results of inoculation are likely to be on soils where nodule bacteria are naturally absent, and the least profitable where Leguminosæ have been greatly cultivated. Between these two extremes there are all grades.

I cannot close this article without placing on record my indebtedness to Professor Nobbe and Dr. Hilltner, who received me at Tharand with great courtesy, and gave me every opportunity of making inquiry, and becoming acquainted with the methods and experiments.

SALTED SNOW DECLARED A LEGAL NUISANCE.—The use of salt to melt snow in the streets has been declared by the House of Lords to be an indictable nuisance. Salt melts snow but only converts it into a freezing mixture which, besides being abominable for traffic, is also most dangerous to health. It is now declared that whether or not the municipal authorities clear it away at once, it is a public nuisance to make this plus-quam-freezing mixture in the street. The decision only has one drawback. It related to a Scotch borough, and, in Scottish law, any private person may sue on account of the nuisance. In England, there would be some doubt unless special damage could be proved.

THE CATTLE DISEASE IN JAMAICA.

INTERVIEW WITH MR. GEORGE DOUET.

VERY little lately has been heard, publicly, of the cattle disease, but some action must have followed the publication of Professor Williams' report, and with the idea of obtaining what information might be available on the subject, a *Gleaner* representative called upon Mr. George Douet, Secretary of the Agricultural Society.

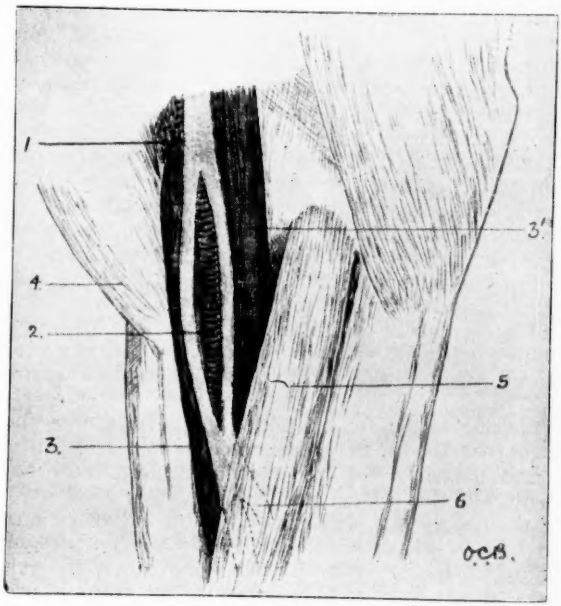
"You ask me if anything has been done," said Mr. Douet, "since the Report was published. I should say a great deal has been done. I have seen quite a number of penkeepers in different parts of the island, who assure me that they have been following out the Professor's recommendations to the letter, and with most satisfactory results. The chief thing to aim at is the removal of the cause, ticks—and the remedy prescribed, tar and oil, has proved most effective. Some persons have complained that it strips the hair off a little, but the reason of this I think will be found to be the improper using of the ingredients, the tar not being properly amalgamated with the oil. One fact which goes to show the extent to which the Professor's recommendations have been adopted, is one I learned on enquiry at the Stores, where I was informed that the demand for boiled linseed oil was very great. The penkeepers are taking the greatest possible care to prevent the accumulation of ticks in their stock, and the animals, as a result, are improving materially in appearance and condition. If all our penkeepers would unite in waging war against ticks by picking off the larger ones and dropping them into a little tar before applying the mixture to the animals, the pastures would be rid of millions of ticks. I myself took 350 ticks off one cow, and as, at a low calculation, each tick would lay 3,000 eggs, that meant a relief to my pastures of at least a million of the pests. If only we can get the penkeepers and others to continue a combined campaign against the ticks, we may hope in time to get them somewhat under control. I am glad to say that I have heard of no fresh cases of disease lately, and the visit of Professor Williams has been a blessing to the penkeeping industry in more ways than one. The report is under consideration by a committee of this Society, and their recommendations will shortly be laid before the Society."—*The Jamaica Gleaner*, December 7th, 1896.

Cases.

AN ABNORMAL MEDIAN NERVE.

BY O. CHARNOCK BRADLEY, PROFESSOR OF ANATOMY, NEW VETERINARY COLLEGE, EDINBURGH.

AN unusual and interesting variation of the median nerve was recently revealed during the ordinary work of the dissecting room, in the right fore limb of a horse, it is said, of Belgian extraction.



1. Median nerve. 2. Posterior radial artery. 3 and 3^1. Venæ comites. 4. Biceps flexor cubiti. 5. Flexor metacarpi internus. 6. Muscular branch to flexors.

The nerve had the usual disposition until it arrived at the upper margin of the tendon of insertion of the biceps flexor cubiti (Flexor brachii). At this point a bifurcation into almost equal portions took place. One of the branches was placed in front of the posterior radial artery, the other behind. Then about 60 m.m. below the point of bifurcation, re-union occurred, and a single nerve was again produced about the

point at which the nerve and artery buried themselves beneath the flexor metacarpi internus. The re-united nerve, after a very short course, contributed the customary muscular branch to the flexors in the posterior antibrachial region. The arrangement of the parts is shown in the accompanying diagram. I should observe that the nerve had a slightly larger volume than that structure in the opposite limb—a characteristic I have somewhat exaggerated in the figure.

The middle point of the fusiform figure described by the two nervous branches was almost exactly opposite the point of contact of the humerus with the radius.

I have been tempted to place this peculiar arrangement on record because I do no not remember having met with, or heard of, a similar occurrence, though such cases may have happened, and through the natural inertia of humanity we have not been treated to a description of them. Again, an abnormality of this kind should be of especial interest to those practitioners who perform or contemplate performing median neurectomy, for it is quite conceivable that such a double nerve would cause a considerable amount of embarrassment, or, perhaps, nullify any benefit of the operation, on account of the surgeon mistaking the posterior portion for the usual muscular branch of the flexors. I am not aware that the muscular branch is ever given off so high up in the limb, but it is possible that it may be so, or, at any rate, that the operator should imagine that he had to deal with such a case.

On making a careful examination of the nerve fibres, I found that at the point between the re-union of the split nerve and the origin of the muscular branch there was a decussation of the fibres; and, consequently, the interpretation of the occurrence, as I take it, is this: that the muscular branch had a high origin, and then lower down gave back some fibres to the parent trunk, receiving others in exchange. Of course this is merely a hypothesis, but, from a practical point of view, it is of no consequence whether it is correct or not; the fact remains that there is the possibility of a confusing abnormal arrangement about the seat of median neurectomy.

Personally, I should be very grateful if any veterinary surgeon, meeting with a similar case, would make a record of it.

GANGRENOUS DERMATITIS.

BY W. R. DAVIS, NEW VETERINARY COLLEGE.

THE present winter has given us a very large number of cases of inflammation of the skin of the extremities leading to necrosis, sometimes of the skin only, at other times going deeper, and affecting the subcutaneous structures, and in one case extending to the sheath of the flexor tendons, and causing the death of the animal.

The first case occurred on the appearance of frost early in December, and we have been having them ever since. The salting of the tramway lines has something to do with the affection, but abrupt and great changes of temperature must also be blamed. As a rule, the determining cause was a slight tread, at other times a cracked heel seemed to be the starting point; in some cases, however, no break in the skin or contusion could be found.

Case I.—Chestnut gelding, lame on the near hind limb; tenderness on feeling the inside heel an inch above the coronet. The shoe removed and the foot examined, and no cause of lameness found. A poultice was ordered two days after; there was fluctuation over the part; it was opened, and exit given to a couple of tablespoonfuls of dark red material (pus and necrotic tissue); the finger went in three inches forward along the lateral cartilage. The part was well washed out with antiseptics, and poulticed again for two days. The lameness had now disappeared. A hollow had, however, formed limiting a circular patch of skin about three inches in diameter; from this hollow a little pus was oozing. Soon the patch of skin sloughed off, leaving a granulating surface, which by the application of antiseptic power (iodoform, boric acid and zinc oxide) soon healed up.

This case seemed to arise without the intervention of any wound or bruise.

Case II.—Bay cart gelding. Had been lame in the off hind-leg for about a week; the lameness was supposed to be due to a cracked heel and the owner had treated him as usual by soft soap and hot water baths. When seen by us the horse was violently lame; in fact, he could scarcely put the foot on the ground and every now and then caught it up, plainly indicating that there was very great pain, and that the case was one of much gravity. On examining the limb it was found to be swollen from the pastern to the hock, the swelling extending along the flexor tendons. Although the swollen parts were exquisitively sensitive no fluctuation could be detected. In the hollow of the pastern was a granu-

lating surface and a fistula discharging greasy reddish pus. It was a very difficult matter to get a good examination, as the horse, a big, powerful animal, would scarcely allow one to handle the limb. The animal was immediately put into slings and the leg treated by antiseptic baths and poultices. He died two days afterwards apparently from septic pneumonia. I regret that a *post-mortem* could not be had. The leg, however, was examined, and it was found that there was inflammation and necrosis of the sheaths of the flexor tendons and of the tendons themselves. The necrotic process had extended round the sides of the fetlock joint, attacking the lateral and the capsular ligament; the joint, however, was not open. The skin was greatly infiltrated. All the structures involved were bathed in a dark-coloured fœtid material. The peculiarity of this case is the rapidity with which the process advanced. As a rule, necrosis of the flexor tendons arising from, say, a gathered nail, is a very slow process, but here, a fortnight at the outside sufficed to bring about their destruction. This horse had been troubled with a cracked heel some time before, and this was doubtless the point of departure for the condition which caused his death.

Case III.—Cab-horse, aged. Lame in the near hind; swollen at the coronet over the extensor tendon; when walked the limb is caught up in the peculiar manner seen in horses lame from injury to the extensor tendon, near its insertion. This action is very like stringhalt. Foot examined and nothing found. The wall is well rasped below the coronet in front and a poultice applied. In a few days the hollow line with oozing pus maps off a big lump of skin which promptly falls off and leaves the granulating surface, which, after a considerable time, and the application of dusting powder, dries up.

Case IV.—Bay, hairy-legged mare, used in a coal cart, lame in near hind. There is a good deal of swelling round the fetlock and on the sides of the canon; most marked posteriorly. Here and there on the swollen surface are rounded raised places with a circumference equal to that of a shilling. The animal does not seem to feel any pain when the general swelling is handled, but the raised patches are sensitive and feel boggy. The lameness is not great.

A poultice is applied for two days, and then most of the patches are found to be fluctuating and are opened and exit is given to a thin yellow pus, a couple of tea-spoonsful from each patch. Poultice again for a day, then antiseptic lotions on lint, and later, drying powder is the treatment prescribed.

When the parts were healing the limb looked exactly as if it had been point fired with a budding iron. This case was very likely due to frozen salt slush; if it was so, every splash seemed to have taken effect like the mud with which Obadiah's coach-horse beluted Dr. Slop.

It would be tedious to go into details of the process as it affected all the patients; it will suffice, therefore, to say that most were attacked in the hind limbs, that the first intimation of anything being wrong was lameness, and that this was most severe when the coronet was involved. The diagnosis was not always easy; in one case sprained tendon was suspected, as there was swelling along its course and nothing else to account for the slight lameness with which the horse was affected. Two days afterwards, however, a boggy, painful place was found in the heel and the usual course of events evolved.

The treatment was poulticing for a few days, and then antiseptic dressings. Where the determining cause was a tread, there was usually a loss of a big patch of skin, and the process was superficial; in other cases, although the patch of skin mortified was small, the structures below were invaded deeply and widely. Most of the animals were at work again in a fortnight, some in a less time. A lesson to be learned from these cases is, I think, that cracks and other wounds in the neighbourhood of the foot, require great care in frosty weather, especially when salt is used in the streets.

THE other day I heard a horse story, which will hardly be believed because it is true. Fish stories are always implicitly relied on because they are invariably the products of some fertile imagination, but the horse has never occupied his proper place in history, because he is a noble animal, and does not lend himself to fiction, except of the Dick Turpin order, which, for lack of variety, soon runs dry. A well-known veterinary surgeon, who holds a retainer from one of the chief railway lines of this country, was called in to examine a horse which had developed symptoms of feverishness. The animal perspired profusely, and shook his head from side to side with a jerky motion, indicative of acute pain. Colic at once suggested itself, and after an injection had been administered and the stomach gently rubbed, the horse was walked quietly round the yard. Suddenly he stopped, and after sniffing two or three times, he jerked his head sharply forward, when out of one of his nostrils ran a live mouse. How the rodent got into such queer quarters is not, of course, definitely known, but possibly he was having a quiet feed in the horse's manger, when, being disturbed, he ran into what, in his hurry, he mistook for his hole. Truth may be stranger than fiction, but whether or no, this tale is true.—*Sporting Chronicle.*

Editorial.

VETERINARY EDUCATION IN AMERICA.

MUCH food for reflection, and much cause for satisfaction, is to be found by a perusal of the December number of *The Journal of Comparative Medicine and Veterinary Archives*, published in Philadelphia. I refer more particularly to an article on education, consisting of a "report of committee on intelligence and education," special reports by Drs. Faust and Baker, and a discussion on these reports by members of the U. S. Veterinary Medical Association. In another part of this JOURNAL will be found a synopsis of the committee's report, giving statistics of the veterinary educational establishments in America, and to these I direct the attention of my readers as well as to the original article itself. Throughout the article, it may be remarked in passing, one meets with strange words and strange phrases, which grate a little on our English ears, and one begins to ask if the day is coming when the English language and the American will be separate branches of the old tongue. It does seem curious to hear of a report on "intelligence"; to our ears such a report might indicate one framed by naturalists or zoologists, scarcely one framed by surgeons on the state of schools and colleges. But, perhaps, we, as "foreigners," have no right to be so critical.

In an analysis of the report, we learn that "of the 17 colleges whose catalogues" (what is meant by "catalogue"? We generally associate the word with libraries or cattle-shows. Can it mean "prospectus" or "syllabus"?) "are in possession of your committee all but three, the Ontario Veterinary College, the Indiana Veterinary College, and the Detroit Veterinary College, require three sessions of at least six months each; while the New York State, Iowa State, and Ohio State Colleges, the University of Pennsylvania, and Harvard University, require about nine months to complete a session. . . . The New York State College proposes in the immediate future to make the course four sessions." This latter information will be very gratifying to veterinary surgeons in this country who have a high appreciation of their professional work, who know how difficult and profound and extensive a study veterinary medicine is, and who are eager themselves to extend and deepen their studies, and thereby acquire for themselves, and for their professional brethren, a higher scientific and social position.

I greatly regret to learn that the Ontario Veterinary College lies at the bottom of the educational ladder. Not

only is its course of study only two years; in this it is not worse than Detroit (which, however, promises extension to three years), and Indiana Colleges and Columbia University (likewise promising amendment); in matriculation examination it is extremely defective. It prescribes merely reading, writing, and spelling—not even our traditional three Rs.—and it goes on to state "candidates failing in matriculation examination may proceed with their studies, on condition that they pass the examination at any time before the commencement of the second session." The Report comments on this with the most delightful sarcasm, as follows: "Your committee would like to know how a person who cannot read, write, and spell well enough to pass the entrance examination can profit by the lectures given, and will have time enough, in addition, to learn these subjects." Of this there can be no doubt whatever. The Report is quite horrified at its own revelation, and almost apologizes for startling the veterinary public. "Still," it goes on, "there is the information in print, public property!" The mark of exclamation is ours, and we gladly draw attention to the shortcomings of Ontario College, in the hope that this public exposure will lead to reform.

A more serious matter remains to be discussed. In this country the veterinary surgeon, though he has many grievances, has many solid advantages. It is true he has a long and arduous college course, preceded by a stiff and searching preliminary examination. Still, let the student work hard and let him satisfy the examiners, who are for the most part reasonable men; at the end of his course he gets his degree, M.R.C.V.S., and this means a great deal. A wise and patriotic Government has conferred extensive powers on the Royal College of Veterinary Surgeons. Its degree enables a man to practise not only in England and Wales, Scotland and Ireland, but in all the British colonies and in the United States of America—wherever, in fact, the English language is spoken. This is really a proud distinction and a great privilege; it has taken us many a long day and cost us many a hard struggle to obtain it, but there it is. Now let us hear what is the state of things in America. "A man may graduate at a college which has a sufficiently long course, and the first State he goes to he finds he is obliged to pass another examination; he stops there for a few months, and realising that he is not doing so well as might be expected, he goes to another State, and there he is called upon for another examination, so, no matter where he travels, if he

crosses a State-line he must pass another examination and take out another license to practise." How would our young practitioners like if they were compelled to pass a second examination and pay for another diploma when passing, say, from Berwickshire to Northumberland, or from Cheshire to Flint? The Report continues, very wisely: "we should try to get a uniform standard, so that after a man gets out of college, he may be permitted to practise in any State."

There is no doubt that this is the only solution of the difficulty, and I, as a veteran in the profession, would urge upon my brethren in America to buckle on their armour and gather their forces together, drill these forces carefully and energetically—severely, if necessary—and then, presenting an unbroken front, let them go forward to the State and the Central Government and compel a recognition of their claims. But let them remember the words of Shakespeare: "Thrice is he armed that hath his quarrel just." The first thing to be done is to insist upon a uniform entrance examination for all the colleges that are to participate in the advantages, and not only uniform, but of a fairly high standard, controlled at the beginning, if thought desirable, by some educational body, such as one or other of the Universities. Recalcitrant colleges will have to be lashed into efficiency and obedience, or else abandoned to inevitable poverty and ultimate extinction.

Then the course of study in the various colleges will have to be codified and made of uniform standard. If there is to be an American Veterinary College, empowered to grant degrees of national validity, there must be unity in the schools, so that a man who has taken his degree may be trusted to have attained to a certain state of efficiency, and may pass current like a coin of standard weight and purity. There must be no debased coinage; there ought to be only one degree. If there are two, the tendency will be to the lower degree, to the so-called conservation of energy, and the status of the veterinary surgeon in America will never rise to its proper and natural level.

An effort might be made to co-operate with the Royal College of Veterinary Surgeons in this country, so as to obtain reciprocity of advantages, but this project may be reserved for future discussion. I merely throw out the hint at present. I hope the day will come when veterinary surgeons all the world over will form one harmonious and compact body, but that day is still far off. My hearty desire is to see a beginning made in the right direction by my brethren across the Atlantic.

AMERICAN VETERINARY COLLEGES.

NAMES OF COLLEGES.	Governing Faculty of Professors.	Proportion of *Veterinarians.	Adjunct Faculty.	Proportion of Veterinarians.	Matriculation.	Curriculum.
University of State of New York (American Veterinary College ...	7	5	13	10	*Regent's Veterinary Certificate	Three sessions, six months each.
New York State Veterinary College		3	13	not reported	*Regent's Veterinary Certificate	Three years of nine months each.
University of the State of New York New York College of Veterinary Surgeons	9	4	14	8	*Regent's Veterinary Certificate	Three sessions of six months each.
United States College of Veterinary Surgeons... ...	10		not reported	not reported	Not reported ...	Three sessions of six months each.
Veterinary Department of University of California ...	10	5	4	none	Not reported	Three sessions, six months each.
Chicago Veterinary College	13	9	3	2	Ordinary English education	Three sessions, six months each.
Detroit College of Medicine (Veterinary Department)	6	3	none	none	Ordinary English education	Two sessions, six months each.
Harvard University	12	4	9	5	English and one Foreign language	Three years, nine months each.
Indiana Veterinary College	10	7	8	3	Reading, Writing and Arithmetic	Two sessions, six months each.
Iowa State College	9	2	6	2	English and Physiology	Three sessions, or six terms of seventeen weeks each.
Kansas City, Veterinary College ...	18	12	4	2	English branches	Three sessions of six months each.
Chicago, McKillip Veterinary College	10	5	not reported	not reported	English branches	Three sessions, six months each.
McGill University (Veterinary Department) ...	3	3	8	1	English branches	Three sessions, six months each.
Ohio State, University College of Veterinary Medicine	8	1	4	2	Two, ordinary and advanced	Three sessions, nine months each.
Columbia University National Veterinary College ...	11	7	6	4	English branches	Three sessions, six months each.
Ontario Veterinary College	7	3	1	1	English branches	Two sessions, six months each.
Pennsylvania University Veterinary Department	8	3	9	7	English and Physics	Three sessions, nine months each.
Ohio Veterinary College (Cincinnati)			No return.			
Montreal Veterinary College			No return.			
	* The highest Veterinary Matriculation of any.					
Totals	157	81	102	47		

Proceedings of the Royal College of Veterinary Surgeons and Veterinary Medical Societies, etc.

ROYAL COLLEGE OF VETERINARY SURGEONS.

A QUARTERLY meeting of the council was held on Wednesday, 13th inst., at 10, Red Lion Square, under the presidency of Mr. R. C. Trigger. There were also present General Sir Frederick FitzWygram, Messrs. Edgar, Villar, Wartnaby, Dewar, Mulvey, Kidd, Faulkner, Bower, Fraser, Lawson, Locke, Simpson, Wragg, Mason, Penberthy, McFadyean, Dollar, Lambert, Butler, Shave, Hartley, Mr. Hill (secretary) and Mr. Thatcher (solicitor).

The SECRETARY read the notice convening the meeting.

The SECRETARY reported that Messrs. Peele, Elphick, Beddard, Williams, and Abson regretted their inability to attend the meeting.

The minutes of the quarterly meeting of October 22nd and of the special meeting of November 5th, 1896, were taken as read and confirmed.

Correspondence.

The PRESIDENT: There is a considerable amount of correspondence that I must ask your careful attention to because some of it deals with important matters which must come before you.

An Unfortunate Student.

First is a letter from Professor W. O. Williams enclosing an application from a student, Mr. MacDonald. The case seems to be a peculiar one, and an unfortunate one as far as the student is concerned. The student states that a year and eight months ago he was laid up in hospital with scarlet fever just before he was due for his first professional examination in May, and consequently was unable to get through it until the following Christmas. He was eligible for his second professional examination at Christmas, but was again laid up with scarlet fever, and only got out of hospital on the day of the examination. He should like to know if under the circumstances he could take out his three years' classes, and in the event of his getting through his second examination in May, might he be found eligible for his third next Christmas. The illness occurring both times before the examinations made it impossible for him to sit, and he hoped that it would be possible for him to take up his three years' work next term, by doing which he could have a chance of saving the time which otherwise would be lost. He enclosed a doctor's certificate for the last illness and he had also a certificate for the former one, but unfortunately it had been destroyed. Dr. Wood, late superintendent of the hospital, who wrote the certificate, was dead, but if necessary he could procure one from the doctor who sent him to the hospital on the second occasion.

We have here a medical certificate, and everything seems to be clear and straightforward so far as the student is concerned. He was in hospital laid up with scarlet fever from November 5th to December 11th. Professor Williams gives the young man an excellent reference, and he says "Please lay the enclosed case before the Council for consideration. I am of opinion that Mr. MacDonald's case is one well worthy of consideration as he is, and always has been, a hard-working student. I believe that such cases are frequently looked into in other professions."

Mr. MASON: Have we any power to deal with this question?

The PRESIDENT: I am rather afraid we have not.

Mr. MASON: If we stretch a point we shall only create mischief.

Mr. MULVEY: As a matter of fact we have no power.

The PRESIDENT: The solicitor says that however much we may regret the matter we have no power to do anything in this case.

Mr. WARTNABY: I propose that the student be written to to the effect that the Council regret the matter, but cannot accede to the request.

Mr. FAULKNER seconded the motion, which was agreed to.

The Action of the Board of Agriculture.

The PRESIDENT: The next letter is from Mr. Hunting *re* the Board of Agriculture, and I will ask the Secretary to read it.

The SECRETARY then read the following letter:—

January 9th, 1897.

To the President and Council of the R.C.V.S.,

Without, I hope, trespassing upon the duties of the Governing Body of the profession, I beg to direct attention to the manner in which the Board of Agriculture has fulfilled its promise to restore the Veterinary Department. I feel sure the Council cannot approve the action of the Board, which is nothing more than a paper statement that the two veterinary officers are constituted a "Department" by themselves. To my mind this is a greater insult to the intelligence and dignity of the profession than the action of the late President of the Board in abolishing the name, position, and duties of the Veterinary Department which had existed for a generation, and had done work approved by statesmen and by the stockowners of the country. It is incredible that the House of Commons would uphold, even by a party vote, an arrangement which is opposed to reason and which has been accompanied neither by economy nor by efficiency during the three years of its existence. I therefore venture to suggest that the Council might initiate and organise some movement in which practitioners all over the country could bring our case before their local members of Parliament. When the exact position had thus been explained the Council might obtain the assistance of a member who would lay the matter formally before the House of Commons.—Your obedient servant,

WILLIAM HUNTING.

THE PRESIDENT: You have heard Mr. Hunting's letter; have you any resolution or suggestion to make upon it?

Professor DEWAR: I beg to move "That Mr. Hunting's communication be referred to the Parliamentary and General Purposes Committee."

Mr. KIDD seconded the motion, which was agreed to.

Exemption of Veterinary Surgeons from Juries.

The PRESIDENT: I will now ask the Secretary to read the report from the solicitor on the proposed exemption of veterinary surgeons from juries, after which I shall have the pleasure of making a very brief report as to what the solicitor and myself have done.

The SECRETARY then read the following report from Mr. Thatcher:—"In accordance with the resolution passed at the last quarterly meeting of the Council, that the solicitor should report at the next council meeting the steps that should be taken for, and the probable cost of, obtaining an Act of Parliament to exempt veterinary surgeons from acting on juries, I beg to report:—

"(1). The procedure to obtain such an Act would be by some member in either House introducing such a Bill and seeing it through the necessary stages in his House, and by a member of the other House taking a similar course after it had been passed in the first House, or by getting the Government, through the Privy Council, to introduce such a Bill. The latter course is preferable for two reasons. In the first place it would be of the nature

of a Government measure, and in the second place I am informed that the Government is likely to make great demands upon the time of the House of Commons during the coming Session, and that Bills introduced by private members may have to wait a very long time. If the Council decide to adopt this course, then a petition should be prepared and submitted to the Privy Council.

"(2.) With regard to the probable cost, I should think that even if the Government took it up they would still consider fees payable. Assuming everything to be favourable I should put the minimum cost at about £200, but should there be opposition and the bill be referred to a committee for evidence to be taken, the cost would be very much greater, and it is impossible to make an estimate."

The PRESIDENT: I think I may save much discussion if I now make a short statement. Owing to the influence and good offices of our solicitor, who has certainly exerted himself in this matter, the Attorney-General, Sir Richard Webster, kindly consented to receive myself as President of the R.C.V.S., with the solicitor, to consider the matter. The solicitor and I waited upon him yesterday, and laid before him our views. I need hardly tell you that I availed myself of the opportunity with much satisfaction, and Mr. Thatcher and I laid before the Attorney-General the salient points, and what we thought to be the strongest claim we could put forward. The Attorney-General asked us on what grounds we based our claim, and we pointed out to him that veterinary surgery of to-day was a very different matter from the veterinary surgery of a generation ago—of twenty or even ten years ago. We pointed out that we had now delicate investigations to conduct, and that the health of the community was to a large extent in our hands. Sir Richard Webster advised us to memorialize the Privy Council. He said "You must get your petition well and influentially signed, and memorialize the Privy Council for permission to bring in a bill. Do not go for an Act of Parliament yourselves, as you will have no possible chance of getting it at the present time. Having the permission of the Privy Council to bring forward the Bill get a county member of influence to introduce it." I will not mention any names, but Sir Richard Webster mentioned one or two gentlemen whose names would carry great weight if they would undertake the matter. As an officer of the Crown, of couse, the Attorney-General could promise us nothing, but he gave us a very kind assurance that at all events we should have his sympathy.

Mr. SIMPSON: As I ventured to introduce this matter to the Council some time ago, and moved the resolution that Mr. Thatcher should investigate the subject, I now beg to move:—"That the Privy Council be petitioned in the terms that you, Sir, have suggested.

Mr. LAWSON: I shall be happy to second that.

The PRESIDENT: Whilst on the subject, I think it should go forth to the profession how important it is that every member of the veterinary profession should do what he possibly can to influence his local member of Parliament to give his cordial support to the Bill. In that way we shall get it through. The resolution was carried.

The PRESIDENT: I think it would be convenient with regard to drawing up this petition and the other work connected with it, if the matter were referred to the Parliamentary Committee.

Mr. MULVEY: You want to memorialize the Government and then bring the Bill in.

The PRESIDENT: All you want to do now is to refer this to the Parliamentary Committee.

Mr. MULVEY: I move "That the solicitor's communication and the matter

generally with regard to the exemption of veterinary surgeons on juries, be referred to the Parliamentary and General Purposes Committee."

Mr. FAULKNER seconded the motion.

The PRESIDENT: I must ask you to add to that resolution that the Committee be empowered to prepare a petition and send it round.

Mr. MULVEY: I accept that.

Mr. FAULKNER: I was going to suggest that they should have power to carry through the recommendations, and I also accept your suggestion.

The PRESIDENT: The resolution now is "That the solicitor's communication and the matter generally with regard to the exemption of veterinary surgeons from service on juries be referred to the Parliamentary and General Purposes Committee, and that they be empowered to prepare the petition and send it round." The resolution was agreed to.

Mr. WRAGG: I should like to point out to members of Council—a great many members are much younger men than I am myself, and, perhaps, may not remember it—that some 20 years ago Sir John Coleridge introduced a Judicature Bill having a clause in it exempting veterinary surgeons from serving on juries. That clause passed, but, unfortunately, the Government of that time were turned out of office, and the bill did not pass. I think it is well that the profession should know that.

Notices of Motion.

The PRESIDENT: The next business is a notice by Professor McFadyean of his intention to move an alteration of Bye-laws:—"To amend the Section of Bye-law 72, headed Examination D, so that it shall read as follows:—

(1.) Principle and practice of veterinary medicine including meat inspection (written three hours; oral, 1 hour).

(2.) Principle and practice of veterinary surgery and obstetrics (written, 3 hours; oral 1 hour)."

The only alteration involved in that is a transference of the words "meat inspection" from veterinary surgery to medicine." I need not enter into the reasons which lead me to think that that is an improvement. My own opinion was that these notices of motion are not amendments, and that it was not necessary to move them, but the ruling which was given by the solicitor yesterday, leads me to think that it is advisable, at any rate, to regard it in the meantime as necessary. I also beg to give notice of my intention to move the following. It is with regard to the conduct of the D Examination, (1). "In order to qualify for the D Examination a student who in the D Examination fails to satisfy the examiners, in respect of theoretical knowledge, must attend the lectures and courses of instruction at a recognised veterinary school during the interval between his rejection and the next examination.

"(2.) A student who in the D Examination displays sufficient theoretical knowledge of the subject, but fails in practical knowledge, shall not be required to re-attend at a veterinary school in order to qualify for re-examination, and he shall not be re-examined except with regard to practical knowledge."

Presentations to the Library.

The SECRETARY announced the following presentations as having been made to the Library:—

The Journal of Comparative Pathology and Therapeutics, by the Editor. *Hoppa-Segler's Zeitschrift fur Physiologische, Chemi*, by the Editor. "Annual Report of Board of Agriculture," by the Editor. "Annual Report of the Imperial Bacteriologist, India," by the Editor. VETERINARY JOURNAL, *Veterinarian*, *Veterinary Record*, by the Editors.

Mr. WRAGG: I beg to move that a vote of thanks be accorded to the donors for their presentations.

Mr. MULVEY seconded the motion which was agreed to.

Registration Committee.

Mr. SIMPSON (the Chairman of the Committee) read the report of the Registration Committee and moved its adoption.

The report stated that the list of names for removal from the Register was submitted to the committee in consequence of non-compliance with the requirements of section 5, sub-section 4, of the Veterinary Surgeons Act. The list was directed to be published in the journals. The committee recommended that the names should be removed from the Register.

The committee had also considered the cases laid before them which comprised charges of advertising against members of the College and against unqualified persons for breach of section 17. In most instances the committee directed customary notices to be sent, and in others directed enquiries to be made. With regard to the advertising cases, the solicitor was instructed in several instances to call upon the offending parties to appear before the committee or to give undertakings; and they had had before them two members on the charge of advertising. The report further stated that the secretary reported that he had received a letter from the Privy Council enclosing a petition from Mr. Howard for restoration of his name to the Register, and the committee directed that a reply be prepared and submitted to the Council. The committee had considered the application for restoration of Mr. Howard, and it recommended that he be restored to the Register. The names to be removed from the Register for non-compliance with section 5, sub-section 4, were as follows:—J. P. Adams, James Baley, J. T. P. Carter, Hugh Clarke, Frederick Coleman, E. P. Dwyer, William Fairbairn, J. E. Fletcher, M. W. Gatwood, G. A. Herron, W. T. G. Hodgins, Herbert Howell, James Mills, Daniel Stewart, H. F. Sugden, H. P. Taylor, C. E. Williamson, and Robt. Yates.

Mr. FRASER seconded the motion for the adoption of the report.

Professor MCFADYEAN: I should like to mention that although I am not a member of this committee, against my will I was present and heard part of the proceedings yesterday, and I heard it stated with reference to one whose name was on that list that his present address was known to a member of the committee, who volunteered to give it. It was not accepted. Now it seems to me to be an extraordinary proceeding. All that we wish is to get the correct address of the members of the profession. We do not want to fine them supposing they have neglected to leave directions at their last address, what their new address is. I refer to the case of Mr. W. D. Fairbairn. It is known to me that his present address is St. Andrews, and I think it is possible that there are some other gentlemen whose present addresses might be known to members of the Council. One of the gentlemen whose name is there is brother to a member of the profession in London. Surely our Secretary might have written to him to ask whether he knows where his brother is.

The PRESIDENT: May I point out to you and to the Council generally that this extreme step is never taken until not only letters come back from the dead letter office, but until a registered letter is sent to the same address and returned to us?

Professor MCFADYEAN: That is no argument, surely, in a case where the address of one of these gentlemen is given to a member of the committee. Mr. W. D. Fairbairn's address is known to Professor Dewar and myself as being without doubt St. Andrews at the present time.

The PRESIDENT: We had not that before us at the committee. We had

no address given to us. But it is quite open to you to move that any name can stand over for a time and not be struck off to-day.

Professor McFADYEAN: I do move, sir, that the names of Mr. Fairbairn and Mr. Frederick Coleman be not struck off.

The PRESIDENT: You move as an amendment "that the report be adopted with the exception of striking off the names of Fairbairn and Coleman, and that they be referred back to the Registration Committee."

Professor McFADYEAN: Yes.

Veterinary-Colonel LAMBERT: I also gave the address of Mr. Adams, yesterday, and I believe Mr. Hill accepted it—Mr. John Spencer Adams.

Professor McFADYEAN: I will include that name in my motion, and my motion will now refer to the names of Messrs. Fairbairn, Coleman, and Adams.

The PRESIDENT: Very well. Will you amend your list, Mr. Simpson?

Mr. SIMPSON: With pleasure. What I propose to do is to erase these names, and then move the adoption of the report.

Professor McFADYEAN: That is agreeable to me.

Mr. SIMPSON: May I point out that the Secretary has no choice in the matter? The directions are most distinctly made out as to how he is to proceed. He having proceeded in the authorised way has no other course open to him but to recommend that the names should be removed.

Professor PENBERTHY: I have no fault to find with the secretary, and I cannot say I sympathise with men who do not do their duty in returning their names. This is not a matter of two months or six months, it is generally a matter of more than twelve months. But inasmuch as three names have been excepted, I do not object to that. I should like to mention, however, the names of two other gentlemen and have them deleted from the list. I have reason for thinking that I know the addresses of those two gentlemen. Their names are Mr. Hodgins and Mr. Carter, and I will communicate with them.

Mr. MASON: I know a gentleman whose name is there and I know him intimately, but I go the other way. If he will not act according to the rules of the College he must get re-registered and pay his guinea.

Mr. MULVEY: I also know the address of one of the gentlemen on the list, but I certainly agree with Mr. Mason.

Mr. WARTNABY: Is not that matter referred to in the bye-laws?

The PRESIDENT: I understand, Mr. Simpson, you will delete those three names?

Mr. SIMPSON: Yes, with the consent of the Council. May I amend my proposition, sir?

The PRESIDENT: Yes.

Mr. SIMPSON: Then I move the adoption of the report subject to the exclusion of the paragraph dealing with the striking off of the men's names. I will deal with no names at all. Let the list be taken as a separate motion.

Mr. MASON: I will second that.

The PRESIDENT: It is moved by Mr. Simpson, and seconded by Mr. Mason, "That the report he adopted except so far as it refers to the names of the gentlemen who are to be struck off the Register."

Agreed to. (*To be continued.*)

Fellowship Degree.

A meeting of the Court of Examiners for the above degree was held on Saturday, December 12th, 1896, in London, when the following having passed the necessary tests were admitted Fellows of the Royal College of Veterinary Surgeons:—

Mr. W. Pallin, Curragh, Ireland.

Mr. A. W. Reid, London.

ARTHUR W. HILL, *Secretary.*

EASTERN COUNTIES VETERINARY MEDICAL SOCIETY.

(*Continued from page* 53.)

Rheumatoid Arthritis.

This disease may arise from either constitutional or local causes. Its chief characteristics are a peculiar rigid condition of the joints affected, generally the stifle joint, especially when the animal is first moved, accompanied with a crackling sound, with in some cases painful muscular spasms simulating stringhalt. The swelling of the joints is caused by effusion into the synovial cavity of the articulation in the early stages, but when the case is of long standing fibrinous and osseous substances are sometimes found in the joint, to the formation of which substances there is a tendency rather than to the destructive process of suppuration. The disease appears to be caused by cold and damp to which the young animal may be exposed, and from the marked tendency to the disease in the progeny of certain mares, one is inclined to suspect that heredity may also be a cause more or less remote.

The treatment, I confess, is palliative rather than curative; nevertheless in some cases the result has been most successful, even beyond expectation. At the commencement a mild purgative may be given, the animal should be placed on short litter in a loose box, and hot fomentations applied to the parts affected two or three times a day, afterwards a refrigerant lotion containing potass, iodide, and plumbi acet., well rubbed in for ten minutes each time. This line of treatment is continued for two to four weeks, and is followed by the application of bin-iodide unguent, repeated if necessary. A generous diet is prescribed, and the patient should be kept warm and quiet.

Rheumatoid arthritis is not to be confounded with simple dropsy of the joints (hydrops articuli), in which the secretion of fluid is abnormal and excessive, gradually distending the textures implicated, which, by adapting themselves to the altered circumstances, seldom produce lameness. Such cases are best treated by pressure, blisters, or firing, with the view to effect reabsorption of the effused fluid.

Discussion.

Mr. J. Hammond said it had been his practice in past years to use a great deal of warm water for these cases, but he found that warm applications were not advantageous. He quite agreed with the essayist as to the advantage of allowing the bandages to remain on for several days. Mr. Overed appeared to be of opinion that the inflammation of the synovial joints in lambs and foals was not congenital, but he felt sure it was congenital in lambs. In several cases in which he was called in he found the ewes doing very badly, suffering from abortion. The placenta was very unhealthy, and great mortality amongst them. At the same time that they had this disease he noticed enlargement of the joints. After three or four days the lambs would appear to be fairly healthy, and then inflammation of the joints would come on, and they died. He came to the conclusion that the lambs' blood was poisoned through the unhealthy state of the ewes.

Mr. W. Bower said that when the animal was suffering much he found warm fomentations preferable to cold. There came a time, of course, when they could with judgment use cold. The great idea was to favour the condition of the animal without trying, in the first instance, to stop the escape of the synovia. Sometimes it could not be stopped for a time; in some cases never. As the animal goes on favourably, then they could try to check it by various astringents. Packing of the joint was the great thing to stick to. If they only kept the bandages on, excluding the atmospheric influences, the cases would do well, though the condition of the animal must at all times be

attended to; during febrile symptoms a low diet, and afterwards it cannot be kept too well.

Mr. W. SHIPLEY, JUN., said his opinion was that open joints were best treated, in the first instance, as simple wounds. The first treatment must be antiseptic, and next to throw the joint out of work; get it set fast and give it a chance to heal. He had found perchloride of mercury, either by injections or powder by far the best treatment. He had a case within the last fortnight of a horse with a hole right through the hock joint. On pressing it the synovia flew out as though from a squirt. He took a small piece of perchloride of mercury about the size of a split pea, which he put into the hole, and considered it sufficiently antiseptic for his purpose. Then he put a blister on the joint to keep it stiff and still, and had a splendid result. He was very much in favour of blistering the joint, however great the flow of synovia. There could be no doubt that navel ill was a septic disease due to the introduction of some germ, probably by the umbilicus. Whether it was congenital or became infected at birth was a matter of opinion. He believed the germ obtained access by the umbilicus to the body of the fœtus immediately it was born.

MR. J. E. KITCHIN said he had had some very bad cases of open joint in horses, but he must disagree with the essayist and Mr. Bower in regard to bandaging. He had tried it repeatedly. When he had bandaged up an open knee joint and left it for three or four days, he always found that it broke out somewhere else. He had also tried perchloride of mercury without any result whatever. He believed in a continual flow of cold water over the joint. He had a big horse now being treated in this way, and it was certainly getting well. This was the treatment now taught at college and advocated by Professor Macqueen, Of course it could not be done everywhere, but at the Great Eastern Infirmary they had a tap in every stable, the horse was slung, and there was a continual flow of cold water over the affected parts. He had a case for two months of open elbow joint caused by a fork. The wasting of the muscle round the shoulder joint was frightful; it stood out just like a skeleton, and the horse had to be destroyed. For open knee joint the only treatment he should attempt was cold water. For many cases of punctured feet by picking up nails he found this treatment useful. If he had an obstinate case he took an ordinary poultice bag, filled it with lime, kept repeating it with fresh lime and this stopped the discharge. After that he made a mixture of ordinary whiting and carbolic acid, and spread it on as a paste. For making the horn grow quickly there was nothing better. When a lad with Mr. Robinson, at Greenock, the latter made a splint for open joint; he did not know whether it was much used now in practice but there they used it with very great effect. He quite agreed with blistering and throwing the parts into rest. For open knee joint he blistered inside the heel, behind the knee, and up the elbow, making the horse keep the leg in absolute rest.

The PRESIDENT said he fully concurred in Mr. Kitchin's remarks as to treatment. For freshly-made open knee-joint he had found most beneficial results from the introduction of perchloride of mercury into the wound with an immediate blister. That was one of the best modes of treatment. He had not found any benefit from bandaging, though he had tried it repeatedly, both in fresh and old-standing cases. The joint always inflamed, and it was sure to slough somewhere else. In many cases of open knee-joint unslaked lime has been a very good antiseptic, and facilitated the healing process, by, he presumed, its antiseptic properties. Cold water he had constantly used with the best results. Of course, in country practice they had no waterworks, but they could always adapt something that would answer the purpose in the shape of a receptacle overhead and a length of rubber tubing acting as a syphon, and so getting a continual

flow. As to open navicular joint from punctured wounds through nails, bichloride of mercury, either in solution or injection was one of the best means of stopping the flow of synovia. Pure carbolic acid introduced into the wounds where there was a large flow of synovia had also had a most beneficial result. His old friend, Mr. Santy, was particularly in favour of pure carbolic acid being introduced into the cavity of open knee-joints. All these remedies were worth trying. With regard to diseased joints in young animals, he considered that they were due to the introduction of germs through the umbilicus, either from being broken or for want of its being tied after birth, and he suggested in such cases the application of some good antiseptic to the umbilicus at the time of birth as a preventative.

Dr. CASE said that he had seen a joint made aseptic, covered with cotton wool, and laid up for 14 days, and at the end of that time it was perfectly healed up. In the London hospitals bandages were not taken off for a week or ten days. There was no doubt that aseptic treatment was *the* treatment. There was no germ-killer like perchloride of mercury. Carbolic acid was not in it. Blistering was a very good idea. He had had his knee blistered, and he knew he kept it quiet.

Mr. H. ROBERTS said that cold water was satisfactory in every case of lesion, used with some slight antiseptic. He did not agree with Mr. Hammond that specific arthritis is congenital. He took a lot of trouble when a student at college to get at the bottom of this. In his essay on the subject, printed in *The Veterinarian*, he quoted extensively from Bollinger, who had much experience of it in Bavaria, where it was a terrible scourge in all the large breeding studs. He had a client who told him he was going to breed a mare which always had a schooly foal, and he prepared an antiseptic for him to use of perchloride of mercury solution, but the result was not satisfactory, and he had a postcard to say that the foal had gone the same way as the others. He thought that infection from the placenta was probable, and that the umbilical cord formed a suitable nidus for the development of the specific germ that was the cause of this disease. They should try to prevent rather than cure this troublesome complaint amongst young stock. Bollinger's treatment was worth several trials if one had an opportunity. He had not had any cases of open hock-joint, but he should certainly try Mr. Shipley's plan.

Mr. GOOCH said that for the last three or four years he had treated open knee-joints solely by bandages with the best possible results. His usual method was to make the wound perfectly aseptic in the first instance, by thoroughly cleansing it and removing all particles of dead or injured material and then washing it out by a syringe. Then he applied an antiseptic dressing of perchloride of mercury, and covered the whole limb with ordinary antiseptic cotton wool. This he covered with antiseptic cotton gauze, and then put a bandage over the whole length of the leg from the hoof to above the knee as tightly as possible. It was very important to begin at the top of the hoof, and bandage to above the knee, keeping an equal pressure the whole way up the leg, and by so doing preventing any swelling. He allowed this dressing to remain on for three, four, five, or six days. If there was much swelling he removed the dressing, and if not much allowed it to remain. When he took off the bandages he found the wound in a beautifully healthy condition. He kept it undone as short a time as possible, then cleansed it with an antiseptic and bandaged the whole length of the limb again. Since he had adopted this plan he had done away with one of his greatest terrors, open knee-joint. With regard to open hock-joint, generally they were not called in till two or three days after the accident when there was a large amount of inflammation or swelling. Then the best possible treatment was that advised by Mr. Shipley of the introduction of a small plug of perchloride

of mercury and the application of a blister. When he had been called in early to such cases, he had lately applied an antiseptic solution of shellac dissolved in spirit and ether, till it formed a thick crust, covered it with cotton wool, and if possible applied a bandage. In many cases he had had the very best results from this method of treatment. A few years ago, oil of cloves was highly extolled, and he used it frequently, but he never saw the least result. He placed his whole confidence in perchloride of mercury for internal injection into the joints and dressing with an antiseptic solution, usually coal tar. He had tried cold water and other treatments, but none of them had answered so well.

Mr. J. KITCHIN said that when in Liverpool he tried putting the whole leg into plaster of Paris, kept the joint perfectly quiet, and the cases came all right.

Mr. W. J. BOWER said that with regard to its breaking out in another place after bandaging he did not object to that. If they could only get the injured part to heal, they would not have much difficulty about healing it afterwards elsewhere. His friend Kitchin rather condemned him for bandaging, but as a fact he had cured by bandaging, for he put on lime and the lime cured, because it protected the wound from atmospheric influences. He might not call it a bandage but the wound was being closed in the same way. As to breaking out in another place he had not had any cases of the kind, except when the flow was stopped too quickly. They were not all agreed as to the treatment, and it became every man to praise the bridge that carried him safe over. What was right in one case might be wrong in another, and the constitution of the animal was something to be considered. With regard to infection from the umbilicus he treated the umbilical cord as soon as the animal was cast and had it done thoroughly. He liked to put it on a sawdust floor in a clean stable which he had disinfected thoroughly as well.

Mr. KITCHIN said he did not call a poultice a bandage at all. The discharge was allowed to come into the poultice and the effect of the lime poultice was not pressure at all.

Mr. W. SHIPLEY, Jun., said he quite agreed with Mr. Kitchen that the lime treatment was antiseptic. That must be the treatment for open joints or any other wound. When Mr. Bower speaks about atmospheric influences he is referring to antiseptic treatment. If they put something on that kept the germs from the wound, whether it was a poultice-bag or a bag of lime, the result was the same.

The PRESIDENT said that probably Mr. Bower's success in bandaging was not due to the bandage but to his method of applying the bandage over some antiseptic agent. He had tried bandaging right from the fetlock to the elbow, but with the very worst results. Had he had the experience then that he had now he should have put an antiseptic under the bandage, and the probability was that he should have obtained better results.

Mr. BOWER said that when he had a nasty little wound in the knees he had very often tried to heal it by making a bigger wound, for the sake of getting more granulation.

Mr. HAMMOND said that as to specific synovitis he had seen mares in perfect health, with everything satisfactory as regards the placenta, and yet their foals had suffered from this very disease. As to lambs, he had had instances in which 20 or 30 per cent. of the ewes had done badly. The ewes had had unhealthy placentas, and the lambs had come down with specific arthritis. Therefore he came to the conclusion that in lambs it was congenital.

Mr. T. E. AUGER wished to add his testimony to the efficacy of blisters in cases of open joint. He had two cases now of open hock and elbow joint. In the case of the former nothing could be done till they got a blister on it. Where the wound was too large to introduce sublimate the powder could be

dusted over it. Both his cases were doing well. In elbow joint cases he found it a good policy to carry the blister a good way round the joint and well up the shoulder so as to keep up a good swelling.

Mr. HOWARD said he had come to the conclusion that the cold water treatment was the best when it could be applied. A fomentation or few hours syringing was no use. There must be a continued flow of water over the affected part. He had been surprised at the good result from inserting a plug of perchloride of mercury into a wound and allowing it to remain for a few days. He had also tried the varnish treatment with good success. Still he agreed with Mr. Kitchen that if they had the appliances there was nothing better than the continuous application of cold water. It was also a good plan to use perchloride of mercury and bandages of cotton wool kept on for some time without disturbing the wound. In a case of open joint, first cleanse the wound, then put the animal into a thoroughly clean healthy sweet-smelling stable; never put it over a bed of filthy manure or some stinking place, as that would bring on arthritis in a very severe form. He believed in not disturbing the wounds more than could be helped. The two essentials were cleanliness and perfect rest for the joint. For rheumatoid affections there was nothing better than a good blister, which gave rest and removed the effusion. He had tried the bag of lime and had a very good recovery in a case of open joints of the feet.

Mr. OVERED, in replying to the discussion, said his opinions were formed exclusively upon practice during the past 30 years, and without egotism he could say that it had been as fairly successful as could be wished. Of course all cases of open joint could not be cured, and where there was caries of the bone or anything of that sort animals had to be destroyed, but where cases were not hopeless from the first he had generally succeeded in curing them. He had a troublesome case of open coffin joint last year and his friend Mr. Bower advised alum. He had tried pretty well everything else but he tried alum and had a splendid recovery. He should certainly try alum again. He once had a case of punctured foot caused by a horse picking up the sharp spinous process of a bullock's spine. It struck through the sole into the coffin joint, and was very troublesome to remove. He tried several remedies, and was ultimately successful. He had more trouble with punctured joints than with any other cases, though it might be because he had not tried lime, as suggested by his friend Mr. Kitchin.

A hearty vote of thanks was then given to Mr. Overed for his paper, on the proposal of Mr. HOWARD, seconded by Mr. SMITH, and supported by the HON. SEC.

Mr. OVERED having spoken in acknowledgment, Mr. J. KITCHIN proposed a hearty vote of thanks to the President. He always had, he said, the greatest pleasure in coming from London to the meetings of the Eastern Counties Veterinary Medical Society. It was always pleasant to come amongst old friends and neighbours, and there was no other veterinary society that entertained them so well, or where they could so enjoy themselves to their hearts content, and at the same time have good discussions, in which, though they differed, they did so amicably and with such good feeling.

Mr. W. BOWER seconded in similarly appreciative terms, and the President having briefly replied, the proceedings ended.

SCOTTISH METROPOLITAN VETERINARY MEDICAL SOCIETY.

(*Continued from page* 58.)

PATHOGENIC ORGANISMS.

Professor O. CHARNOCK BRADLEY gave a lime-light exhibition of various pathogenic organisms. In the first place he threw on the screen a diagram

showing that organisms were classified into two great groups, those which were circular or spherical in shape and those which were rod-shaped. The rounded group included the ordinary mirococcus, the diplococcus—being two of the former attached to each other—the streptococcus, a fairly common form, being characterized by a chain-grouping of organisms; the staphylococcus, which was a very irregular grouping, being simply a cluster, assuming a somewhat grape-like appearance; the encapsuled-coccus; the sarcina, formed in groups of fours. The second slide showed the rod-shaped organisms. These were the bacteria; the bacillus; the spirillum, a beautiful wavy form; and the nomad. Some pathogenic organisms had the power of rapidly moving across the field of the microscope. If they examined some they would be surprised at the rapidity of the movement, and so long as the organisms were living they were unable to make out much of their appearance. These slides were simply thrown on the screen to indicate the various forms that organisms might take. The next slide showed the staphylococcus, which caused the majority of cases of suppuration. This was a very widely spread organism. It was to be found in the soil, and also on various parts of our own bodies—between the toes, and on those parts where the skin was almost always moist or covered with hair. The lower animals, being covered with hair, afforded suitable resting places for these organisms. There had been some experiments with this particular organism. It was capable of producing an abscess in the short period of forty-eight hours when introduced beneath the skin of a finger This showed that suppuration might occur at a very brief period after the wound had been made. With reference to the dissemination of this organism, it had been shown that it could be transmitted from animal to animal and from man to man, by the handles and blades of instruments. It showed them, therefore, how extremely cautious one should be in using a knife which had not been thoroughly cleaned after opening an abscess. If the knife was not rendered thoroughly aseptic, then suppuration might result from contamination. No greater sign of the great change in surgery was to be found than in the light in which cases of suppuration are now viewed. Nowadays, with antiseptic surgery, suppuration had been reduced almost to a minimum. The next slide showed the streptococcus of strangles, which was composed of little round bodies arranged in a chain-like form. The next slide, said the lecturer, was not of very great interest to veterinary surgeons, except that it showed that possibly in a few years they might find a similar organism to be the cause of the ordinary form of pneumonia in cattle and horses. This slide had been prepared from the discharge from a human being. The pneumococcus is characteristic as being arranged in pairs. The lecturer then showed a photograph of the portion of the intestines of a case of swine fever. The intestines were simply covered over with ulcers. He did not propose to tell them what caused swine fever; but he would show them one of the eight organisms which had been described as causal agents. So far swine fever had been a mystery. He thought he was correct in saying that eight so-called organisms had been described, and yet they had to consider that the cause was not definitely determined. This slide represented one of these organisms. It was an ordinary bacillus with round ends. The next slide represented a piece from the lung of a case of anthrax. The lecturer next showed a slide, representing the bacillus as being in the blood and not in the tissue. It showed them one phase in the life history of the organism. It showed them that in the blood they were reproduced by one organism cutting itself into two. The next slide represented the photograph of a gelatine tube inoculated with anthrax bacillus. The growth was best marked at the point of entrance of the needle, and it dwindled away to nothing in the lower strata. This brought out the fact that the bacillus required oxygen for its growth, and that it grew best where oxygen could be got at. The next slide showed the

filament stage of the organism's life history, and the succeeding slide showed a filament composed of short rods. Each rod had developed a light coloured spot. That light coloured spot was a spore. The point to be remembered in connection with spores was that sporulation was only found when the blood had left the body. When the spores had once been formed, they had, apparently, a very firm hold upon life, so that they might remain dormant for weeks, or months, or even years; and when they got into an animal, they set up the usual pathological process by developing into bacilli. This power which the spores had of remaining dormant for long periods, explained how it was possible for anthrax to remain latent for a long period. Then for some reason or other, perhaps because the farmer suddenly resolved to clean out a particular place, these spores were disseminated, and gained access into healthy animals. Spores might be carried from farm to farm, or country to country. Sometimes anthrax was caused by manures, such as bone manure from Russia and other parts of the Continent. The next slide represented one of the organisms which produced blackleg, a disease which for a long time was supposed to be similar to anthrax. This organism which produced blackleg had rounded ends. It was a local parasite in the body, causing tumour-like swellings of the limbs. Anthrax, on the other hand, was generally found throughout the animal's whole system. The next slide was a preparation from a pure cultivation of the organism of tetanus. It was called the drum-stick bacillus. The spore formed at one end, and caused an enormous swelling. It, again, was a local parasite. It was not to be found in the blood. It only grew in connection with wounds, and that being the case they must suppose it produced a poison which circulated through the body, and, gaining the spinal cord, produced the tetanic spasms of the muscles. The next slide represented a specimen of bovine tuberculosis from a young animal, showing the bacilli arranged in the form of a circle. The succeeding slide showed the bent appearance of the organisms, and the lecturer explained that these organisms grew extremely slowly. The next slide represented the glanders bacillus, which was in some respects similar to that of tubercle. Another slide represented the pus from the liver of a human subject affected with actinomycosis. A few more slides of an equally interesting character were exhibited and briefly explained.

The CHAIRMAN, in moving a vote of thanks to Professor Bradley, said they had been extremely delighted with the exhibition, and he hoped the Professor would appear before them on some future occasion, especially when experiments with regard to the bacillus of tuberculosis had been more fully developed.

Principal WILLIAMS, in seconding, said the exhibition had been most interesting and instructive.

Iodine Treatment of Purpura.

Mr. R. RUTHERFORD, Edinburgh, drew attention to the iodine treatment of purpura. Some of their Edinburgh stables were singularly unfortunate in having many cases that developed into this disease. The treatment which up till recently he had found fairly successful—two out of three recovering, where the surroundings were sufficiently favourable—had not been improved by the adoption of the iodine treatment. In fact, three horses to which he had given it a fair trial had one after another died. He had just now given it a fair trial to another horse. In this case there was positively no apparent cause for the disease. The horse was an American one which had been imported into this country about a year and a half ago. During that time it had had three attacks of what one might term necrotic pneumonia with an excessively high temperature and excessive weakness, and a very persistent chest cough. Recovery had always taken place after each attack, and the horse was working

very well until about twelve days previously. When he called, the man in charge said this horse had its hind-leg swollen, and he said he had bandaged the leg. Being somewhat in a hurry at the time, Mr. Rutherford said he would examine the horse particularly on the following day. When he called next day and saw the horse, he was astonished to find that it was a well-marked case of purpura. It had run its conrse in 24 hours, and developed into a strongly-marked case of purpura. The head was enormously swollen, and he had to perform tracheotomy. His legs were also swollen, and it was altogether a very bad case. In his experience he found in every case of purpura, if a horse got down and did not rise, that case would prove fatal. This horse showed little inclination for the swelling to leave his limbs, and he began to blow. Mr. Rutherford reduced the swelling by the application of moisture to the extremities, but he liked it to remain there as long as possible. His early treatment of the case was his original treatment—oil of turpentine and chloride of potash in his water. After the trachea tube was put in, he thought it a favourable opportunity for giving the iodine. He gave the iodine for two or three days, but the horse was not doing well, in fact, he was decidedly going back. He injected into the trachea five grains of iodine dissolved in potassium, and this was injected once a day. He reverted to his original treatment, and now the horse was doing well on quinine itself, with an infusion of a medicine which he largely used in India, namely, chiretta, and also strong ales, and milk, and things of that sort; and the horse was going to recover, although it was one of the worst cases he had ever seen. It was a bay horse with black legs. In his opinion, if they could get a horse to eat, it would get better. In conclusion he said, he had been driven to the old treatment, and he was satisfied that it was much better.

Mr. AITKEN, Dalkeith, said he had had three cases. He adopted the treatment of iodine and potassium injected into the trachea, and he scarcely gave anything else, as the treatment had been successful.

Mr. RUTHERFORD: You have fine air, however, in Dalkeith.

Principal WILLIAMS, in reply to a question, stated that they did not get many cases of purpura at the New Veterinary College.

Mr. RUTHERFORD, in answer to questions, stated that in the case he had mentioned the horse was in a beautiful upstairs stable, with an open window in front of his head. There was no fault to be found with the ventilation.

Mr. MOIR said he had tried the turpentine treatment, and sometimes cases had recovered. There was no doubt that the turpentine was the sheet anchor for many years. He had seen cases where iodine was injected into the trachea. In one case he would have had no hope of recovery, but, to his great astonishment, the horse recovered. From what he had witnessed of the treatment with iodine and iodide of potassium, he should certainly advocate it and practise it.

The CHAIRMAN said that in former years he generally depended upon turpentine and tincture of iron. He had a large number of cases now of erysipelas, and he treated them very much on the same principle, with turpentine and tincture of iron.

Principal WILLIAMS said he did not know what erysipelas was in horses.

The CHAIRMAN said that in purpura they had an abrupt end to the swelling, but in erysipelas there was a lumpy swelling which did not end in an abrupt way but was a gently sloping swelling. That was one outward appearance of erysipelas.

Use of Anti-Tetanin.

Professor W. OWEN WILLIAMS asked if anyone present had had any experience of administration of anti-tetanin in cases of actual tetanus. It was stated by some that anti-tetanin was only of value when introduced into

the system of an animal prior to operation or prior to its removal to a dangerous district. Others had stated that the introduction of anti-tetanin in animals that had impending tetanus or actual tetanus was efficacious.

Mr. A. C. NEWSOM said he had experience of one case, which had been under the ordinary treatment for eight or ten days without any result, but after two inoculations with anti-tetanin, the animal recovered in a most miraculous manner.

Mr. RUTHERFORD said that if a horse with tetanus got over the eighth day, anything was good enough for improving him.

Mr. NEWSOM (continuing) said that about twelve o'clock on the day when the animal was inoculated it was in a decidedly bad state. It was rather late in the day when they gave the first inoculation, and the temperature dropped two degrees, and the animal was distinctly quieter. He repeated the injection, and visiting the animal in the evening found that a still further improvement had taken place. From that period the animal gradually recovered.

Some discussion arose as to where anti-tetanin could be obtained. One member stated that he had spent six hours in Edinburgh trying to purchase the stuff, and was prepared to spend £2 12s. 6d. for one dose, but he could not get it. Mr. Newsom stated that his cost £2 15s. He got it through the dispenser of the Royal Infirmary, but only as a special case. He had since received a letter from the dispenser, stating that he believed Mr. Baildon, chemist, Princes Street, Edinburgh, could supply it. Other members declared that not a drop was to be got in Scotland.

Mr. MOIR said it had been recorded within the last two years that tetanus was very common in many districts after castration, where the operators were very unsuccessful, most of the colts dying from tetanus. That was proved to be due to the surroundings in certain districts of France, where tetanus was common whoever operated. This serum was discovered, and the colts were all inoculated with serum to prevent tetanus after castration. This had had the desired effect, because in some districts where 50 per cent. of the colts had died—(Principal WILLIAMS, "More than that")—the death rate was reduced to a minimum through this preventive inoculation. We could not blind ourselves to these important facts in reference to the efficacy of anti-tetanin.

Mr. NEWSOM said he had only used anti-tetanin in one case, but he would try it again if an opportunity arose, and he would recommend it to anybody else.

SEPTICÆMIA IN COWS.

The discussion upon Mr. Boyd's paper on Septicæmia in Cows, read at the general meeting at Melrose, was adjourned till the annual meeting in February. Mr. Boyd, who will then occupy the chair as the new President of the Society, promised to deal with the subject in his address upon that occasion, so that the matter would be brought before the members with fresh interest.

A vote of thanks to the Chairman terminated the proceedings.

THE CENTRAL VETERINARY MEDICAL SOCIETY.

AT the Special Meeting, held at the Royal College of Veterinary Surgeons, Red Lion Square, Bloomsbury, on Thursday night, December 3rd, Professor J. MACQUEEN, of the London Veterinary College, read a valuable paper on "Indian Hemp" (Cannabis Sativa, Var. Indica), contributed by Veterinary-Captain C. Rutherford, Umballa, India:—

As there had been a deal of controversy of late years as to the doses and action of this drug when given to horses, some persons advocating 1 dram to

2 dram doses, whilst one or two others pin their faith to 1 oz. doses, I was anxious to test the drug systematically on healthy and diseased horses.

The plant—a nettle varying from 4 to 10 feet high—grows both in a cultivated and wild state, in the hills and plains. It is said that the quality of the active principle (the resin) varies in that the higher up the hills the hemp is grown, the less resin is there in the plant and the less powerful are its narcotic properties, but I am unaware if this has been proven. It may be that that sold in England is not made from the best portions of the pla nt nor according to the usual formula, and hence the varied opinions as to its action. I have been told that some chemists use tops and leaves, others female tops only, others tops and resin, in the making of the extracts.

The usual formula for Extract cannabis indic. is as follows.—Dissolve one ounce of the female tops (from which the resin has not been removed) in four ounces of rectified spirits, filter, and evaporate to the consistency of a soft extract.

For tincture cannabis indic: dissolve half-an-ounce of the extract in ten ounces of rectified spirits. Note.—Proof spirit must not be used, as the resin is not soluble in it.

The principle forms in which hemp is found and the Hindustani names for the same are:—

1. The resinous substance "cannabin," which exudes spontaneously from the stem, leaves and tops, is the active constituent, and is called *churrus*. It is collected in the following crude manner: (*a*) by pressing the fresh plant between the hands and scraping off what adheres, or (*b*) by coolies rushing through fields of hemp with such violence as to bruise the plants and cause the resin to adhere to them, which is then scraped off their bodies. Certainly an improvement in the method of collection might be adopted with advantage to those who may wish for a pure article.

2. The larger leaves and the fruits without the stalks are called *Bhung*, *subjee*, and *sidhee*.

3. *Gunjah* (Hashish in Arabia) is the dried tops of the *female* plants after flowering. This portion of the plant from which the resin has not been removed is official.

4. Two volatile oils, as well as the "cannabin," are said to exist, and are reported in the pharmacopœia of India by W. Martindale to be "rapidly acting irritating poisons."

Hemp is used in India for various purposes; the seeds are non-medical, but containing a quantity of oil are used as food.

A confection "majoon" consisting of *bhung*, butter, sugar, flour and milk is much extolled in Calcutta and eaten as an intoxicant.

A drink is made by powdering up the female tops in a mortar, adding almonds and sugar, and straining.

Many better class natives, when going long journeys, give the leaves (dry *bhung*) to their horses daily to invigorate them, or more probably to preveut them from taking too much out of themselves.

Some native horse dealers drug vicious horses with *bhung* or *gunjah* before offering them for sale. (I have myself successfully quieted a horse with 3 drams of the extract to facilitate shoeing). The same is used as a poultice for "sore backs." A mixture of tobacco and treacle alternately with a layer of the resin (churrus) is smoked as an intoxicant.

The extract used in the following experiments was from one mass supplied to me, and that used for cases mentioned later was from the same stock, and from chemists in Umballa, Simla, and other places. All were uniform in appearance and supposed to have been made from the female tops only.

I do not think that the temperature makes the slightest difference in the

action of hemp as it has been as good when the temperature was 110°F. in the shade as it was at 50°.

Ext. Cannabis. Indic.
Gave 1 dram in bolus.

{ Temperature in the shade:
At midday—76°F.
At night—58°F.

(1.) *A quiet country-bred Mare, 8 years of age.*

In 2½ hours after receiving the hemp she became sleepy, but was easily roused or awakened, when she became most excited; she trotted excitedly. Her pulse, taken when quiet, was only a few beats more than previous to the administration of the drug; and the temperature was 2–5ths of a degree more. She remained in this sleepy state for about two hours, and then gradually became more wakeful. She seemed normal at the 6½ hours.

(2.) *A quiet country-bred Gelding, 8 years of age.*

At the second hour he became sleepy-looking; there had been no preliminary excitement. In 2½ hours he was standing sound asleep, the eyes were half closed, the legs shaky and bending at the knees, whilst the hocks occasionally "gave way" so that he would sometimes almost fall; the veins of the face were engorged. The pulse was lowered to 30 per minute and became soft, and the respirations from 11 to 9. At the third hour he was sweating at the groin; when taken out of the box he was at first rather excited, and when trotted he did so as if drunk. On being put back into his box he knocked his head against objects as if he could not see distinctly; and then stood with penis "drawn." So he remained for the next three hours, then gradually became more and more wakeful, and at the 8½ hours after receiving the hemp he seemed as usual.

(3.) *A quiet bay, country-bred Gelding, 7 years.*

1st hour.—Nothing unusual noticed. Pulse 4 beats more than before—44 and firm.
1¾ „ Quieter than usual; pulse 38, firm; respirations and temperature normal; feeding as usual.
2nd „ Penis has been frequently "drawn;" quiet as before.
3rd „ „ „ „ „ „ „
5th „ As usual—everything normal.
7th „ „ „ „

(4.) *A quiet grey country-bred Gelding, 7 years.*

1st hour.—No change.
1¾ „ Pulse, lowered, 4 beats per minute.
2nd „ No other change noticed.
4th „ No change.
5th „ „
7th „ „
Evidently the hemp had little if any effect.

Temperature in the shade, at midday, 75°F.

(5.) *Quiet chestnut country-bred Mare, 7 years.*

In 1½ hours she became most easily excited on anyone approaching or touching her—I imagined because she could not see distinctly—and trotted as if she were going upstairs; temperature was normal, and pulse lowered two beats only. So she remained for about an hour, and then gradually became quieter and sleepy until, at 4½ hours after receiving the hemp, she was standing sound asleep with eyelids almost closed, a mouthful of hay

sticking between her lips, and breathing with a slight snore. Her pulse was now 30 (only 6 below what it was before administration of the hemp), but soft and full, She opened her eyes when I was taking her pulse, but immediately closed them and took no further notice of me. She sweated for an hour or two under her loin rug and where the head collar touched the face. At the fifth hour after administration of the hemp, food was put in front of her, when she roused herself up and ate it though in rather a carelessly slow manner, slobbering and making her face dirty. An hour later she was picking at her hay quietly ; her eyes were " heavy " and sleepy-looking ; and skin was now drying. She afterwards was sound asleep for two hours, standing all the time—at any rate, apparently sound, for she was easily waked ; at this time the body became perfectly dry. Three or four hours were occupied over the feed mentioned, which she partook of now and then. After the sleep she roused up and gradually, in four hours' time, was as usual in every way, excepting that her dung was passed in small pellets and in small quantity at a time, and her eyes remained sleepy-looking for about 16 hours after the drug was given.

(6.) *A rather timid chestnut country-bred Gelding, 7 years.*

1st hour—Normal.

3rd hour—Easily startled ; pulse, 6 beats more than before receiving the hemp ; respirations—no change ; temperature 4-5th degree up : legs and ears warm.

5½ hours—When approached, he jumped about most excitedly ; he was sweating profusely at the groin ; the penis has been frequently " drawn " and retracted.

6½ hours—Has eaten feed and grass ; does not seem nearly so nervous ; is warm and dry all over the body.

8½ hours—Normal, and as usual in every way.

Temperature in the shade, at mid-day, 80° F.

(7.) *A quiet bay Waler Mare, 13 years of age ;*

has valvular disease of the heart.

¾ hour—The pulse from 38 and intermittent, became 32 and more intermittent at the jaw ; stands quieter than usual.

2nd hour—Standing sleepy, eyeballs heavy-looking ; legs and ears rather cold, body warm. Trotting, she was most excited.

2½ hour—Pulse 24, feeble and intermittent ; respirations 12 ; temperature normal.

4th hour—Sleepy and much the same.

5th hour—Sleepiness is wearing off ; pulse has risen to 28.

6½ hour—Appears as usual ; pulse 34 per minute and intermittent.

There has been no excitement except when trotted.

Temperature in the shade, at mid-day, 80° F.

(8.) *A quiet country-bred Gelding, 5 years of age.*

1st hour—No change.

2½ hour—Standing unusually quiet ; pulse, temperature and respirations are practically the same as before ; he is most easily excited and most nervous if anyone approaches him suddenly ; trotted, he carries his head very high, steps on his toes and with great knee action.

3½ and 4th hours—Very quiet, not sleepy by any means ; does not seem so easily startled.

5th hour—He appears normal.

Hemp 2 drams in bolus { Temperature: At mid-day—85° F. In evening—58° F.

(9.) *Chestnut country-bred Mare, 10 years, a vicious kicker.*

Temperature 100°, pulse 34, respiration 10. Two hours after administration of the hemp the pulse fell four beats in the minute; at 2½ she began to look drowsy and sleepy and stood quietly with eyelids half closed, the lower lip a little drooping and legs cold. There was no preliminary excitement.

At the 4th hour she was very sleepy, and though eating her grass slowly, she did not partake of her feed of grain and bran; there was a patch of cold sweat on her neck, the temperature 99 3-5th°, pulse 26, soft; respirations 10; and when taken outside, she trotted as usual. There was no excitement and no unsteadiness.

At the 8th hour the temperature was 99°, pulse 26, and respirations 8; the eyes dull and sleepy-looking, the lower lip hanging pendulous, the legs and ears rather cold, and she stood perfectly firmly on her legs, and so she remained up to the 12th hour.

At the 10th hour, when she was eating her feed, her temperature fell to 98°, but this at the 15th rose to 98 2-5ths, whilst the pulse was 30 and soft, and respirations 8 per minute. Afterwards she began to brighten up and at the 23rd hour she was normal excepting that the eyes looked a little dull.

Weather: Cold at night. Warm at mid-day.

(10.) *Chestnut Gelding, 13 years, quiet.*

Temperature 99 1-5th, pulse 34, respirations 8.

At the 1st hour the temperature rose to 99 2-5ths, he was standing quiet but was easily startled, lower lip pendulous, eyes a little heavy looking, and penis drawn 3 or 4 inches.

Up to the 4th hour he gradually became sleepy-looking and at that time was standing over at the knees, shaky on his forelegs; temperature now fell to 97°, pulse 28 and soft, respirations 7, and though picking at grass he was not disposed to eat his feed of grain and bran. When trotted he went very unsteadily.

At the 7th hour the abdomen had become tympanitic, the temperature 97°, pulse 26, and respirations 6; legs and ears were cold, the penis frequently drawn and retracted, and though still dull and sleepy, he ate some grass voluntarily.

At 9½ hours he was still dull and sleepy-looking, etc., but had eaten his food; the temperature was now 98°, pulse 26, and respirations 6.

At the 12th hour he was still dull, sleepy and shaky on his fore-legs; at the 15th brighter, and at the 18th and 23rd hours he was normal in appearance excepting that the eyes had a dull heavy appearance; quiet and feeding.

Weather: Warm and dry, at midday, 86° F. At night—58°.

(11.) *Bay Gelding, 13 years, very quiet.*

Temperature 99°, pulse 36 per minute, and respirations 8. At the 2nd hour after receiving the hemp he was standing quiet, with a sleepy expression of eyes, a pendulous lower lip, and penis drawn three inches; the temperature was 99°, pulse 34, respirations 6; no previous excitement.

At the 4th hour he had eaten his feed slowly, and had a very dull heavy expression of eyes; there was no other change.

At the 6th hour he became drowsy and sleepy, his eyelids half closed, and was standing with shaky forelegs bending slightly forward at the knees. He trotted with an extravagant knee action.

Up to the 12th hour he remained in the same condition, but the temperature went down to 98°, pulse 28 and very soft, the ears and legs had become very cold, and the penis was drawn and retracted at intervals.

After this he began to brighten up, the eyes were less sleepy looking, and legs not bent at the knees.

Weather—dry. At midday—86° F. At night—58° F.

(12.) *Brown Australian Gelding, 14 years, very quiet.*

Temperature 100 1-5th, pulse 44, respirations 8. (This horse has scirrhous cord).

At the 2nd hour after receiving the hemp he was quieter than usual, had passed some dung and eaten some grass. The temperature was 100 2-5ths, pulse 42, full, and respirations 7.

At the 4th hour he wore a heavy expression about the eyes, his legs were very cold, but his ears warm; was eating grass, had passed more dung, temperature now 100 1-5th. When trotted he persisted in tossing his head about a good deal.

At the 6th hour he was markedly drowsy and sleepy looking, standing with eyelids half closed and lower lip pendulous.

At the 7th his temperature was 100°, pulse 42, respirations 8, and he had passed more fæces of usual character.

Up to the 10th hour no other change was noticed, although he roused himself up to drink and eat his feed; but subsequently he gradually and slowly became brighter about the eyes, although the lower lip remained pendulous until the 14th hour. and at this time too the temperature, pulse, and respirations were the same as at the 7th hour.

Hemp 3 drams in bolus { Temperature in the shade; At midday—85° F. At night—60° F.

(To be continued.)

(*Continued from page* 60.)

Investment of Funds.

Mr. BARRETT said he desired again to bring under the notice of members the question of the investment of the funds of the Society. They had, roughly speaking, deposited in the Hammersmith branch of the London and County Bank £150, and their Treasurer had that night informed them that, after meeting the present demands, he had a balance in hand of £43. Thus they had altogether about £193. At the preceding meeting they advised that £100 or £150 should, at any rate, be invested in Consols. The matter came subsequently before the Council, and, rather to the surprise of some of them, it was thought that only £100 should be devoted to the purchase of Consols Some of them considered this was insufficient, and that, inasmuch as they had £193 lying idle, they might at least invest £150 in the purchase of Consols or invest it in other approved securities. Owing to a mistake that had been made, they were unable to discuss this matter at the special meeting which was convened, and, therefore, they should be obliged to send a recommendation to the Council directing them to reconsider the matter. Personally, he asked them to direct the Council to invest as large a sum as possible. They had some £160 or £170 to spare and, therefore, why they should limit themselves to an investment of merely £100 he could hardly understand. From the money which lay at the London and County Bank for years past they could only obtain 16s. per cent. whereas by judicious re-investment they might realise 50s., and if they invested £150 they might, he thought,

easily get £3 10s. or £4. He thought they might further consider whether it was wise to invest in Consols at all at the present time. He considered the Council should invest the surplus money very carefully, regarding themselves as trustees for the Society and using the utmost care in the selection of securities. With Consols at their present price of £112, to invest £150 they would need to spend £168. He thought they might wisely purchase other securities—those of the London County Council or the City Corporation for instance—limiting themselves to the securities ordinarily open to trustees and approved by the Court of Chancery. He thought if they invested as carefully as ordinary trustees did that would be sufficient. He should move as a suggestion to the Council, "That in the opinion of this meeting the sum of £175 should be invested in securities which are ordinarily open to trustees, as approved by the Court of Chancery." It was for that meeting to say how the money should be invested. By one of the rules the Council were empowered to invest the money of the Society but, he took it, any resolution coming from that meeting—especially if it were unanimously adopted—would have considerable weight with the Council; and as a member of the Council, he personally should endeavour in every possible way to give effect to any strong opinion which the Society might have in the matter. He asked them to discuss the subject and decide upon the security which they thought desirable.

MR. ROOTS seconded the motion.

Mr. GARRY said that so far as he understood the meaning of the gentlemen at the Council who favoured the investment of £100 only in Consols, it was this: that a sufficient balance should be left to the treasurer to open a banking account. It was felt that if they invested a larger sum than £100, it would leave a very small sum in the hands of the treasurer wherewith to start a banking account.

Prof. MACQUEEN thought that, as a member of the Council, Mr. Barrett was coming it a bit too strong. Mr. Barrett was a member of the Council, and because he could not conveniently attend the Council meeting, he came to the general meeting, and endeavoured to review the work which had cost the members of the Council a considerable amount of time. He (Prof. Macqueen), as a member of the Council, objected to have the work of that body reviewed in this manner. The very point Mr. Barrett raised had been very carefully considered by a very large meeting of the Council. At that meeting, he need hardly tell them, Mr. Barrett was not present.

Mr. BARRETT: Yes, I was.

Prof. MACQUEEN: The last meeting?

Mr. BARRETT: Certainly.

Prof. MACQUEEN: That only makes the position still worse, because Mr. Barrett's proper place in which to have objected was at the Council meeting.

Mr. BARRETT: So I did.

PROF. MACQUEEN (continuing) said he confirmed Mr. Garry with regard to the intention and meaning of the Council that it would not do to invest more than £100 if it were intended to start a banking account. He was surprised at Mr. Barrett seeking to undo the work of the Council, seeing that they spent about three hours considering the question.

The CHAIRMAN: Excuse my interruption, but on reference to the book, I find Mr. Barrett was present.

Mr. BARRETT: And, what is more, I opposed this £100. I thought it was not sufficient. Of course, I did not carry it.

Mr. HURNDALL said if, as stated, the Council sat for three hours considering this question, he should like to be favoured with the result of the discussion. He must certainly protest against the position which Professor Macqueen took with regard to Mr. Barrett. He wanted to limit the private

rights of the individual. Mr. Barrett was not then present as a member of the Council, but as an ordinary Fellow of that Society, and he (Mr. Hurndall) took it that because Mr. Barrett happened to be a member of the Council, that was no reason at all why he should not have the privilege of expressing his opinions as a Fellow. He (Mr. Hurndall) should certainly support the motion that £150 or £170 should be invested according to the price of the securities to be purchased, and he considered the balance would be sufficient wherewith to open a banking account. Any banker would know that a society of that kind, especially at this period of the year, did not carry a large balance. Were they prepared to sacrifice £3 or £4 for the sake of keeping a banking account?

Professor MACQUEEN asked to be allowed to say a few words in reply to Mr. Hurndall. If anything was wanting in justification of his (Professor Macqueen's) objection to discussion of this point, the remarks which had just fallen from Mr. Hurndall were ample. He referred to the question of whether the Council had ever considered the cost of starting a banking account. Now, that, to his mind, was simply an indication that this further discussion was only a further waste of time, for the reason that the whole question was considered at the Council, how best they could start a banking account, and whether it would cost much or little, and also the question of the amount of money. If they appointed a Council to conduct the business of the Society, they should leave matters largely to the Council until their annual report was presented. Mr. Hurndall asked what the Council had done after a discussion of three hours. Well, if they looked at the agenda paper they would see a notice of motion by Mr. Hunting, that £100 should be invested in Consols. That was the decision arrived at, which they were now asked to re-consider.

Mr. BARRETT said two-thirds of the time mentioned—three hours—was consumed not in discussing the question of investments but the subject of the arrears of subscription. They were not now discussiug the question of a banking account but that of the investment of money lying idle. They had £190 which was practically yielding nothing, and how best to invest most of this was the question. The question of the institution of a banking account was an after consideration. The matter before them was the investment of their funds, and the introduction of the subject of starting a banking account was a mere begging of the real question.

Professor MACQUEEN: I beg your pardon.

The motion was then put and rejected by a considerable majority.

LANCASHIRE VETERINARY MEDICAL ASSOCIATION.

THE winter quarterly meeting was held at the Grand Hotel, Manchester, on Friday, December 11th, 1896. Tea, 5 p.m.; business, 6 p.m. Present:—The President, J. H. Carter, Esq., presided. The following members and friends also attended—George Howe, Ernest S. Gubbin, W. Ackroyd, Alf. Holburr, F. W. Hall, H. Ferguson, E. Faulkner, J. B. Wolstenholme, R. C. Edwards, Thos. Dobie, Wm. Noar, W. Woods, S. Locke, Jas. Laithwood, Alex. Lawson, W. A. Taylor, Wm. Dacre, Munro, Wood-Eccles, Pearson, E. H. Stent, and H. D. Chorlton, hon. sec. Visitors—L. Butters, Liverpool, R. Price Tarvin, W. Duckworth, J. Kenyon, Burnley; J. E. Kitchin, London; Geo. Morgan, Liverpool; J. E. Scriven, Tadcaster; A. W. Mason, Leeds.

The minutes of last meeting was taken as read upon Mr. W. A. TAYLOR's proposition, seconded by Mr. Alex. LAWSON.

Mr. W. TAYLOR nominated Mr. Elvin Plant, M.R.C.V.S, of Holmes Chapel, Cheshire, as a member of the Association.

Professor WILLIAMS read a paper on shivering and stringhalt, reported in the VETERINARY JOURNAL for January, 1897.

Mr. FAULKNER, in opening the discussion, expressed his indebtedness to Professor Williams for the paper, which in a condensed form embraced all their knowledge of, and experience in, the diseases up to date. More information was needed on the subjects because of their importance to horse-breeders, horse-users, and veterinary surgeons, and knowing Professor Williams' intimacy with the breeding societies of Scotlnad, particularly the Highland Agricultural Society, he thought he could further enlighten the members in this direction. From observation, and the results of *post-mortem* examinations, he, as a general practitioner, had come to the essayist's conclusion that in shivering there was disease of the spinal cord and the great nerves, but this required amply demonstrating by research and investigation. There was field enough for experiment, but it was somewhat of a drawback to the profession that its teaching schools were not placed in a better condition financially, by means of endowments, to enable them to investigate such diseases. He had not seen many cases of shivering in light horses, but in his experience of cart horses he was always struck with the intermittency and inconstancy of degree in the symptoms. He had observed stringhalt in heavy and light horses, about the worst case being in what would otherwise have been a very valuable and clever hunter. Breeders had told him that they had seen symptoms of shivering in foals, and cases had been noticed where a stallion, found to be perfectly sound and getting sound stock as a rule, would occasionally leave shiverers from sound mares, and in a particular year would have a greater percentage of shiverers than for five years previously. With these facts before the members they were desirous of obtaining more definite information on the subjects by further observation and investigation, both practical and scientific.

Mr. DACRE instanced a singular case of stringhalt in a three-year-old colt, which occurred this year. In his opinion it was attributable to spasm, and not to any chronic condition. The only case of stringhalt in a fore-leg which he had met with was in a donkey. Their best thanks were due to Professor Williams for reading the paper at the meeting.

Mr. LOCKE thought there must be some irritation of the motor nerves in stringhalt, and that it was hereditary. He would like to impress upon Professor Williams the advisability of defining clearly to students the difference between stringhalt and shivering, as at the last examination he happened to be present at the table when a student was examined on the subject, who, on being asked the difference between the two, and whether he would rather pass a horse with stringhalt or a shiverer, replied "A shiverer." Asked why, "Because in stringhalt there was always a good deal of irritation, making the horse lame, and therefore a shiverer was preferable." Mr. Locke further added that stringhalt did not, as a rule, interfere with a horse's usefulness, although it was unsoundness. He was much obliged to Professor Williams for the paper.

Mr. LAWSON considered that stringhalt was unsoundness, and in most cases it was hereditary. As to Professor Williams's remarks about the shiverer lying down, he thought there were a great many shiverers that never did lie down at all; others of them lie down and get up; others, again, were bad workers. He would never advise anyone to buy shiverers or stringhalted horses—the former were far the worst.

Mr. WOODS thanked Professor Williams for the paper. As to stringhalt being due to some luxation of the patella, he had often seen that when the latter slipped into and out of its place there was a stringhalt sort of action, but it was not stringhalt. They might as well say stringhalt was due to sandcrack of the feet—it was not stringhalt at all. Shivering, in his opinion,

was due to some affection of the spinal cord, or to some pressure of the vertebræ on the nerves supplying the flexors of the hind-legs; what that pressure might be he did not care to describe. He thought Professor Williams's theory would not stand very careful examination, as the worst case of stringhalt he had at the present time was only in one leg.

Mr. WOLSTENHOLME said he would not like to leave the meeting without expressing the greatest pleasure he had experienced in seeing Professor Williams amongst them once again after his trip to the Indies and in listening to the paper he had given to the members. For very many years Professor Williams had had the reputation of being a first-rate teacher and Mr. Wolstenholme thought the address he had given them fully bore out his reputation. Speaking on his own behalf he thought that the precise pathology of the two affections in question had yet to be worked out and that both diseases were distinctly referable to the nerve tissues: He also pointed out certain nervous affections which followed as sequelæ of other diseases as following distemper in the dog, pink eye, and azoturia in horses, milk fever in cattle, and various febrile affections in man and thought that there might be some possible connection between the exposures and ailments of young horses and the subjects under consideration. Further that he doubted whether Professor Williams was in earnest in suggesting that the prevalence of springhalt in and about Edinburgh was due to the muscular development consequent on the hilly nature of the district, and he (Mr. Wolstenholme), could certainly not accept such a solution, for had such a suggestion been a true one he would undoubtedly have expected that the rural postmen in such districts would be found suffering from a similar affection.

Mr. W. A. TAYLOR had seen stringhalt in the majority of cases in one limb only, usually hind one, and had seen it quite as often in mares as in geldings. He had observed it in a fore limb also. As to the pathology of this disease he thought they were no nearer a solution now than in years gone by, and if they wished to elucidate the cause of it it was their duty to send specimens of well-known cases of stringhalt to Professor Williams, who would, no doubt, kindly undertake to make a close examination of them. He asked Professor Williams if he considered there was any relationship between stringhalt and shivering, and whether it was possible for the one to degenerate into the other, and conversely. In his opinion, in stringhalt there appeared to be exalted muscular contraction of the muscles, flexing and extending the limb. Professor Williams' remark that he considered stringhalt unsoundness pleased him, because he had heard other gentlemen, equally eminent in the profession, doubt that it was unsoundness. The speaker took the precaution to always lift the hind legs because he had felt shiverers when he could not see them, and he had seen a hunter shiver with the fore limb which continued so long as the limb was held in flexed condition. Shivering should be classified as a disease in which heredity played a very prominent part, and while thanking Professor Williams for elucidating his theories up to the present time regarding the diseases under discussion, he could only condole with him upon the fact that Scotland was not quite up to date in the examination of horses as to soundness at agricultural shows. He asked Professor Williams if in all or any of the cases of rupture of the flexor metatarsi complete recovery had taken place, also if this lesion happened to a hunter would such recovery take place as would enable him to be hunted again with safety.

Mr. FAULKNER said he was pleased Mr. W. A. Taylor had alluded to shivering in a fore-limb, adding that he had seen several cases, but it was, in his experience, rare. As to sending the specimen from a shiverer to Professor Williams, at the New Veterinary College, Edinburgh, for examination, he still maintained that if institutions such as the professor's, who doubtless did his best to elucidate these obscure pathological conditions,

were put in a better financial position to carry on original research, he thought they would only be receiving that which would ultimately benefit all concerned in obtaining more accurate knowledge.

The PRESIDENT, in thanking Professor Williams for his kindness in addressing them, said he could not add anything new to these obscure diseases. He remembered being called to examine a carriage-horse, valued at 90 guineas, as to soundness. Lifting one hind leg up, there was a distinct shiver. Being a little suspicious, he lifted the opposite leg, which was all right, but when he lifted the other leg again, it was quite right. He passed this horse as sound. There was a distinct sign of shiver now and then.

Professor WILLIAMS, responding, said he had seen as many as two dozen cases of injury to the flexor metatarsi, and he thought Edinburgh being so hilly, conduced towards it. Complete recovery had taken place in a few of the cases, while partial recovery had taken place in several of them. If a hunter recovered, he would no doubt injure it again. He did not wish them to believe the hypertrophy theory which he quoted. Replying to Mr. W. A. Taylor's query as to the difference between stringhalt and shivering, he considered the latter a much more progressive disease than the former. There was a difference in stringhalt within recent years. A number of Canadian horses, after being in Edinburgh for a few months, developed symptoms of stringhalt which were peculiar. The foot went up in a quick manner, but dropped slowly. There was no evidence of disease in the foot. He never told a client to buy a stringhalted horse as sound. He had repeatedly treated cases of shivering with potassium bromide, nux vomica, nervine tonics, and put the horses up to rest, as they always improved with rest unless confirmed or old standing cases. The best way to find out a slight shiverer was to see the horse frequently, recommending work in the meantime, as work undoubtedly developed shivering. Beyond this he had nothing new to suggest. Respecting the question of luxation of the patella, there was a difficulty in bringing the leg forward in this complaint. In partial luxation of the patella, there was a quick drag to bring it forward. As to the teething theory of Mr. Henry Thompson, of Aspatria, they all knew that teething in children and in dogs would cause nervous symptoms; but as a great rule, there were a good many exceptions. Shivering and stringhalt come on when the horse had a full mouth of permanent teeth. He had seen the diseases in young horses, but invariably in horses fully developed. If teething were the cause after this operation was over, the symptoms would disappear, and the animal would resume its normal condition. It might be due to some irregularity of the conductivity of the nerves.

Respecting the President's proposal that a grant be made to the Walley Memorial Fund, Mr. FAULKNER suggested that the secretary should ask the Committee what form the memorial would take so that the Lancashire Association's contribution could be guided thereby.

Election of Office-bearers for 1897.

It was proposed by Mr. W. A. TAYLOR, seconded by Mr. DACRE, supported by Mr. FAULKNER and unanimously carried, that Mr. Carter fulfil the duties of President for another year.

Mr. CARTER briefly acknowledged and exhibited a pathological specimen of stomach and brain, very much congested, of a dog which had suffered from rabies.

Mr. W. A. TAYLOR proposed Mr. Michaelis as Vice-President; Mr. CHORLTON seconded.

Mr. FAULKNER proposed Mr. Wm. Woods of Wigan as Vice-President, and Mr. WOLSTENHOLME seconded.

Mr. Dacre, Vice-President.

Mr. H. D. Chorlton was unanimously elected Secretary for 1897, upon Mr. WOLSTENHOLME'S proposition, seconded by Mr. LAWSON.

Mr. Wolstenholme was re-elected Treasurer for 1897, upon Mr. FAULKNER'S proposition, seconded by Mr. LAWSON.

Mr. W. A. TAYLOR proposed, and Mr. LAWSON seconded, the re-election of Messrs. Faulkner and Jones as Auditors for 1897.

Consideration of certain Members' Arrears in Subscriptions.

Mr. FAULKNER moved that the treasurer communicate with the members who were in arrears with their subscriptions, pointing out that unless the arrears were paid on or before the March quarterly meeting he would be compelled, according to the Society's rules, to bring their names before the Association, when they would be expunged.

Mr. LOCKE seconded and carried unanimously.

Mr. LOCKE proposed that the discussion on the circular letter received from the West Scotland Veterinary Medical Association, be postponed until the next quarterly meeting.

Mr. LAWSON seconded and carried unanimously.

Mr. FAULKNER proposed a vote of thanks to Professor Williams for the paper.

Mr. WM. WOODS seconded.

SOUTH DURHAM AND NORTH YORKSHIRE VETERINARY MEDICAL ASSOCIATION.

A MEETING of this Association was held on Friday, December 11th, 1896, in the North-Eastern Hotel, Darlington, Mr. H. H. Roberts in the chair. There were also present Messrs. P. Snaith, Bishop Auckland; A. Peele, West Hartlepool; H. Peele, Durham; G. E. Gibson, Sedgefield; J. H. Taylor and W. N. Dobbing, Darlington; and W. Awde, Stockton-on-Tees.

Apologies for non-attendance were received from Professor Williams and J. E. Peele, the latter being unwell.

The minutes of the previous meeting were taken as read and confirmed.

Mr. John Wilson, M.R.C.V.S., Eaglescliffe, was elected a member of the Association, and Dr. Hern an honorary associate, proposed by Mr. W. AWDE, and seconded by Mr. J. H. Taylor.

A communication, *re* mallein, was read from the West of Scotland Association, the consideration of which was deferred till the next meeting, on the proposition of Mr. P. Snaith, seconded by Mr. G. E. Gibson.

Mr. J. H. TAYLOR, M.R.C.V.S., Darlington, here read a paper on "Abscess in the Rectum of a Mare."

The patient was a cart mare, six years old, used for farm work, and was attacked with colic about noon. She had been at work all morning and had shown no pain until brought into the stable at mid-day. Very little dung had, however, been seen behind her in the morning, but as she seemed otherwise quite healthy, she was sent to work.

The mare was in slow pain; pulse 48, temp. 101°. A colic draught and a dose of physie was given, and the hand passed into the rectum to relieve it of its contents. About four inches in the rectum I found a swelling about the size of one's fist, which was soft and painful to pressure, in front of which was a quantity of hard dung, the removal of which caused pain. I examined the superior part of the vagina, but found no enlargement there, so concluded that the tumour was confined to the rectum. A sloppy diet was ordered, warm injections given, and sedatives left to be given at such times when pain was shown. On my visit the next morning the mare was much the same: no dung had been passed, and slow pain present, this having been

more or less marked during the night. The rectum was again examined and relieved of its contents, and the swelling was felt to be larger and more painful to pressure. I formed my opinion as to what the swelling was, but as the mare was in no immediate danger, thought I would not meddle with it.

The same treatment was continued until next morning when on my visit the swelling was much larger, and feeling sure that it contained pus pushed my finger into it, thus liberating a good pint of healthy pus. The parts were cleansed and dressed with carbolised oil on tow night and morning for a few days, when the cavity healed, and the mare made a good recovery. I have since met two cases where I found thickened mucous membrane of the rectum forming a strong band, with the same symptoms, but on giving a dose of physic and sedative enemas the mucous membrane has resumed its proper condition in a few days.

Inverted Uterus and Bladder in a Cow.

We are all well aware of the commonest of the first condition, but I think the latter is one only occasionally met with.

On my arrival I found the uterus inverted, following her third calving, with the membranes attached. These were removed, the parts washed with potass, permang. solution, the organ returned in the usual way. When the uterus was almost returned I noticed at its inferior part a red globe-like swelling, which on further examination when the uterus was returned was seen to be the bladder. With patience after well oiling and digital manipulation the bladder was returned and sutures put across the lips of the vagina, having no West's clamp with me. The cow was propped up. an aperient given with sedatives to follow. Very little straining followed, and in a few days the cow was up, doing well.

This case I consider of particular interest to us, as one would think inversion of the cow's bladder to be almost impossible on account of the anatomical arrangement of the urethra in that animal.

Abscess on the Inferior Part of the Thorax, Recovery, Formation of a Renal Abscess, Twist of the Small Bowels, and Death.

The patient was a bay cob used for hacking, and was reported to be off his feed and not doing well. On arrival symptoms of indigestion were noticed; yellowish membranes, dull, depressed appearance, no appetite, fæces hard and covered with mucus. Pulse 40, temperature 102°, respirations normal.

A dose of physic was given, followed by stomachics and vegetable tonics, but little or no improvement took place beyond the cob eating a little at times; the breathing, however, became a little more hurried. This continued for about ten days, when the owner desired another opinion to that of my employer and self, and consultation was arranged.

The consultant was of opinion that hydrothorax was present and paracentesis thoracis was performed with a negative result, and tonics recommended. No improvement was noticed, but about four days after the consultation the groom noticed that there was pain shown when the surcingle was fastened round the rugs. This was mentioned to us on the next visit, and a painful swelling was felt on the inferior posterior aspect of the thorax. This was fomented with hot water each day for about a week, becoming larger and softer. It was lanced, and a quantity of very fœtid pus escaped. The abscess was rather troublesome in healing, a sinus formed which had to be opened up, but eventually it did heal, and the cob was put to his regular work.

A couple of months afterwards, on the groom coming into the yard riding the animal, his good condition was remarked upon; the groom, however,

casually said, "Yes, he's doing well, but has had one or two attacks of colic during the last fortnight, but a colic draught put him alright."

Ten days or so after this a message came to go and see the cob, which was reported very ill.

On arrival the animal was walking round and round the box, cold sweats bedewed the body, and every symptom of death soon taking place was presented. Subcutaneous injections of morphia were given with no effect, and after waiting a couple of hours death took place.

A *post-mortem* was made the next day, and a twist of the small intestines was easy to see had been the cause of death. All the organs were healthy excepting the right kidney, in which was an abscess the size of a large walnut. My opinion was that this renal abscess was the result of the first one, some pus having been carried to it, that the growing of the abscess caused pain and the attack of colic before mentioned, and that the twist had taken place whilst the animal was rolling about during the last fatal attack.

This case is, I think, very interesting, as no cause of the illness was shown; for a fortnight the symptoms were altogether misleading.

Intestinal Abscess and Death.

This was a well-bred, brown mare, the property of my employer, having been his property eighteen months. For six months after the purchase she was much troubled with worms, they were, however, got rid of and she improved and did well. I had been driving her a longish journey in the afternoon, and an hour after my return she was attacked with colic. Everything was done to relieve her but to no effect, and after suffering about five hours she died.

On making a *post-mortem* the next day, inflammation of the whole intestinal tract was well marked, and on opening up the large bowels an abscess at the junction of the cæcum and colon the size of one's fist, was noticed. No other lesions were present, and the question is: Were the worms which previously infected the mare the exciting cause for the formation of this abscess.

Spasms of the Larynx in a foal.

This patient was a well-bred foal about ten months old, who would be quietly feeding, suddenly stop, gasp for breath, and roll over on his side as if dead; the spasm would then pass away, and the foal, after looking a little surprised at what had happened would continue eating.

Spasm of the laryngeal muscles was diagnosed, and a smart blister of hydrarg. biniodi applied round the larynx, which certainly did good, and the attacks were much reduced in number. One day, however, an attack lasted a little too long, and the foal passed away beyond further treatment.

Inguinal Hernia in a Bitch.

This patient was a King Charles spaniel, and a swelling had been noticed in the inguinal region for a few months. It continued to get larger, and advice was sought.

I tried to reduce it, at first with no result, and as it was not painful nor inconvenient I advised the owner to leave it alone. She, however, wished it removed, so I consented to cut down upon it to see what it was, chloroform, of course, to be administered; but as the animal was a fat asthmatical lump of living tissue, I thought it best to manage without it.

The tumour was found to be the right horn of the uterus. A carbolised ligature was put on, and the uterus amputated as far up as I could. I had rather a fright during the operation with the dog fainting, but the wound eventually healed well, being dressed daily with carbolised oil, and argenti nitras when necessary.

Tuberculosis of the Liver of a Cow.

The cow was about six years old; the owner had had her two years, she always doing and looking well. She was reported off her feed, and on arrival we found her disinclined to eat, dull, depressed look, pulse 80, temp. 107°, secretion of milk stopped, and bowels constipated. An aperient drink and stimulant were given, and next day she seemed brighter, her bowels acting freely. Pulse and temperature, however, were the same. Antifebrine was given which brought her temperature down to normal. This was discontinued next day and stimulants and stomachics given, and next day her temperature was up again. This continued for about ten days, the reduction of the temperature being only temporary, for as soon as the antifebrine was discontinued, up it went again. No food was taken, and the cow died.

Post-mortem: All the organs healthy excepting the liver, which was much enlarged and one mass of nodules of tubercular material.

This is another of the many instances that we meet with where diseases may exist and have existed for a long period, without any serious interference to the apparent health of the animal, until a last illness attacks them, and organs in an advanced state of disease may be found.

Two-Year-Old Cart Filly with Ruptured Stomach.

When first seen, about 9.30 a.m., the filly was in a loose box standing perfectly still, pulse 40, temp. 101°, no pain, breathing normal, rectum empty, membranes natural colour, extremities warm.

She had been found lying in a field about 6.30 a.m., round about her being upturned earth as if she had been in pain, and a colic draught was given by her owner. She had not had any pain for half an hour before our arrival.

Thinking naturally that this was a simple case of constipation, a dose of physic was given, the abdomen stimulated, and sedative medicine left to be given at intervals if pain was shown, the owner to bring in word as to her condition on his way into town at 2 p.m.

He called and said that she was much about the same, had been up and down once or twice, and did not think it was necessary to go again.

He called again about 5. 30 p.m. to say that we had better go at once, as his servant had met him on his return home to say she was much worse, sweats appearing all over the body, the animal walking round and round the box. I returned with the owner and on arrival, found the animal dead.

A *post-mortem* revealed a ruptured stomach, the rupture extending the whole length of the organ, the contents being among the abdominal viscera. The question is, When did the rupture take place? I mention this case to learn from members their experience in such cases, for up to meeting this one, ruptures of the abdominal organs have always been pretty well marked during life. It shows how careful one ought to be sometimes in giving a diagnosis of cases, for one is apt to get into bad repute, as I did in this instance. In fact, it seems to me that before very long we shall have to carry about with us a camera with the means of passing the now celebrated **X** rays through our patients to say exactly what is or is not the cause of the illness.

Twist in the small Intestines in a Pony.

This is another interesting and uncommon case in the nature of the symptoms presented. The pony was noticed uneasy in the morning and a colic draught given. The pain continued at intervals during the day; the dose repeated, but no lasting relief being obtained, we were sent for at night, as is usually the case.

On arrival the patient was standing still; pulse 36, temp. 100°; no tympanitis or dangerous symptoms showing themselves; rectum empty, no fæces having been passed since the night before. A dose of physic and a colic draught were given and the abdomen stimulated, and sedatives left to be given at necessary intervals when pain showed itself.

Next morning I learnt the pony had had a little pain at intervals, a little flatus had been passed but no fæces. Sedatives were continued, the abdomen well blistered with mustard and turpentine, and the enema syringe passed a couple of feet into the rectum, the enema returning without any discolouration.

The pony got worse as the day advanced, and on my last visit, about 12 p.m., death seemed near at hand. No more medicine was given as it seemed of little use, everything having been tried, and about 2 a.m. the pony died.

On making a *post-mortem* the next day a twist of the small intestines was easy to see, they being much inflamed, thickened, and parts so dark coloured that one would suspect mortification before death. I should like you to discuss when the twist took place, for we certainly want a little light on such cases.

Inverted Rectum in a Sow.

The patient was about a year old, had been to the boar, and on returning home had commenced to strain, with the result that the rectum was forced down about a foot, the sow straining very violently at times.

I had for my assistants the owner and his wife, and I must confess that the lady was the most useful of the two, as is often the case. The rectum was washed and smeared with carbolised oil, and after much trouble was returned, a towel passed in with it, and a clamp put through the anus. It was not the returning of the rectum which was the trouble, but the putting on of the clamp, for no sooner was the rectum returned and the teeth of the clamp touched the skin than the sow bolted round the candle-lighted, dirty, pig-house, and out came the towel and rectum. However, I made up my mind to be as pig-headed as the sow herself, and at last got the clamp in position. A good dose of castor oil and a sedative were given, and the sow left.

In the morning the clamp was removed, the towel taken out, and a quantity of fæces taken away, the towel and clamp being returned to the former position.

Next day the towel and clamp were removed, and the rectum relieved, and as no straining had taken place they were not replaced. The sow fattened and made good pork.

Cystic Calculus in a Dog.

The patient was a little white toy terrier, and brought into the infirmary as it seemed in much pain when passing its urine, which was bloodstained. It had been unwell for a week previously, but beyond the usual amateur treatment, nothing had been done.

The prognosis was unfavourable, as the little chap was in continued pain, and on passing urine, which it did frequently, it contained a large quantity of blood. For a few hours before death, which took place twelve hours after its admission, nothing but blood came away.

On making a *post-mortem*, cystitis was most marked, the bladder being much thickened, and filled almost with blood, amongst which I found the calculus I have the pleasure of showing you this evening.

Side Bones.

Exostosis, anchylosis of pastern joints, bony groove for tendons. History unknown.

Traumatic Pericarditis in a Cow.

This case was peculiar, for certainly when last seen two days before death, no suspicion as to such being present was entertained. The cow when first seen was suffering from tympanitis in a marked degree, and indigestion in general. She was treated for indigestion and became a little better in a day or so, but after eating the rumen was distended with gas.

The pulse was regular, 60 to the minute, and strong; the third time she was seen we thought she was doing all right, and only wanted a little time. Three days afterwards she was dead, having eaten a mash in the morning, and an hour afterwards was found breathing no more; we then suspected the cause of death.

The *post-mortem* showed us not far wrong, for on the left side coming into view, after the ribs were taken off, adhesion between the rumen and diaphragm was seen, and between the rumen and it was a lymph abscess the size of one's fist. This was opened and the passage of the piece of wire I show you from the rumen to the cardiac sac was easily seen. There was a small wound in the heart caused by the wire. One would certainly have thought we should have had symptoms of pericarditis and an irritable heart's action long before death, but such certainly was not the case.

This, gentlemen, brings to a close my effort to fill the gap this evening. I thank you for your very kind attention, and if we have a good discussion some of us may go home a little wiser than we came. I hope so, for I shall then be amply rewarded for the little time I have devoted to the writing of this summary of a few interesting cases.

Clinical Cases.

As this meeting was entirely given up to the consideration of clinical cases and each member asked to bring forward at least one, the following information was elicited :—

Mr. G. E. GIBSON was called to a Clydesdale mare a few days after she had been covered by the horse and found her suffering from fractured dorsal vertebræ. After her death he found about two gallons of pus in the chest which had been formed at the seat of fracture.

He also stated that the owner of a hunting mare asked him to see her as she was about to be destroyed. When seen the face and neck were denuded of hair, her legs being in the same condition and swollen, the horn substance of the hoofs being quite soft and easily penetrated. From the owner's statement she had got into that state after an illness of about three weeks, but he had decided not to have her treated as he did not think she was worth it. He mentioned a brain case in which he found pus in the cranial cavity, and described the symptoms presented.

Mr. P. SNAITH showed a case of verrucose endocarditis in a pig, the growth of which nearly occluded the cavity on account of its great size, met with while making *post-mortems* for the Board of Agriculture. He also showed the skull of a sheep which was found dead. On making a *post-mortem* to ascertain cause of same, it was found to have had a blow on the head, as the skull was fractured.

He produced the os suffraginis from a horse which ran away, and after the accident was lame off-fore, and continued so for some weeks. An exostosis was felt on the lower part of the bone, and blisters were applied with little or no benefit. As the case seemed hopeless, it was decided to destroy him. The animal, however, was insured against accidents and disease, but the company concerned refused to pay for him, but offered the owner £5 without prejudice. It was surprising to find so small an amount of deposit on the bone considering the intense lameness present.

Mr. A. PEELE then related a case of ruptured stomach in a horse which,

when first visited, did not present such serious symptoms as to lead him to believe that he had such a grave lesion to contend with.

Mr. ROBERTS mentioned cases of pericarditis seen in cattle at various times, and also a swelling met with on the hind quarters of a cow.

Mr. AWDE showed a portion of a spleen taken from a three-year-old colt, the subject of so-called lymphadenoma. It was only seen once; the animal held its head stiffly, and on turning him round he did so quite easily to the near side, but could not be persuaded to turn the other way round at all. On manipulation of the cervical vertebræ at the third bone, he evinced pain on pressure. He had lost condition very much, and was quite razor backed; as he seemed likely to do no good he was destroyed. In addition to the state of his spleen he was informed that there was a growth of some kind attached to the spine in front of the kidneys, no doubt of a tubercular character. Unfortunately he did not see the *post-mortem* himself, but had been unable to find out whether the colt was reared on cow's milk or associated with them in any way. He also mentioned two cases of death in colts resulting from the presence of strongylus armatus. In the first profuse diarrhœa of a bloody character supervened, and death resulted after being ill about 24 hours. In the other there was incontinence of urine, slight abdominal pain manifested by the curling up of the top lip, great debility present and complete loss of appetite, only lived a few days after being seen. Any number of mature strongylus found in the large bowels and numerous cysts along the edge of the mesentery.

A general discussion on the cases followed, and a hearty vote of thanks was proposed to Mr. TAYLOR for his paper by Mr. AWDE, seconded by Mr. H. PEELE, and carried unanimously.

W. AWDE, *Hon. Sec.*

THE NATIONAL VETERINARY BENEVOLENT AND MUTUAL DEFENCE SOCIETY.

THE annual general meeting of the Society was held at the Grand Hotel, Aytoun Street, Manchester, on Friday, December 11th, 1896, Geo. Morgan, Esq., President, in the chair. There were present: Messrs. E. Faulkner, J. H. Carter, A. W. Mason, J. E. Scriven, W. Woods, J. B. Wolstenholme, E. Kitchen, A. M. Michaels, H. D. Chorlton, Professor W. Williams, and the Secretary.

Minutes of the last annual meeting were read and confirmed.

Letters of apology for non-attendance were received from Messrs. J. D. Overed, R. C. Trigger, J. Clark, H. Howse, H. Thompson, A. L. Butters. W. Carless, H. Olver, and A. McCullum.

The CHAIRMAN then addressed the meeting as follows: The first item on the agenda is an address by the President. Fortunately for me, length is not determined, and one is allowed free scope as to a subject. I need scarcely remind the older members that it is now thirty-one years since the first meeting was held, and that many of our warmest supporters of those days have now passed "the bourne from whence no traveller returns." To us who remain, it is some satisfaction to know that the Society has been a success, and that it is now strong and willing to throw its arm of support around the member that is in need of it, either morally or financially. Occasionally we see in the press cases where veterinary surgeons and others are sued for damages, and no matter how much we may sympathise with them we cannot assist them from the funds; they have themselves to blame, for the subscription is merely nominal considering the great and many advantages that the membership confers. You will observe in the circular calling the meeting several suggested alterations of Rules. Very innocent these

alterations look at first sight, but if carried they involve weighty alterations in the aims and working of the Society. I am not one of those who would say that rules should not be altered as time rolls on and circumstances change. Like boyhood's clothes that are too small for manhood and must be enlarged, so with our laws, but we must not change without due consideration. When new suggestions for the guidance of the nation are laid before Parliament, they are not passed into law without close scrutiny, the interior being thrown under the X rays of public opinion, and all flaws and defects searched for before being put on the statute book. Let us then examine these changes carefully; if they be for the good of the Society let them be adopted, but if they only tend to its detriment and ultimate destruction you should in your wisdom reject them. The Secretary will enlighten you on the work of the past year, and the Treasurer will do the same as regards finances.

The SECRETARY, in presenting his address, said he had much pleasure in once more giving his annual report as to the progress of the Society, and of its continued usefulness. He was sorry that more members of the profession did not avail themselves of its privileges, which could be obtained at such a nominal outlay to themselves, viz., £1 1s. entrance fee, and 10s. 6d. per annum subscription. During the year, fourteen new members have been enrolled, and we have now some 180 members, a very small percentage of our rapidly increasing members of the profession.

Your Council have had need to meet on two occasions, to consider several cases of threatened lawsuits, only one of which had to be defended. You will be pleased to know the verdict was for the defendant, We have one case pending, but from what I hear it may be allowed to lapse. Several other cases have been brought before your Secretary, who recommended a bold front, and if legal proceedings be taken to immediately apply for assistance from the Council. I have had several applications from veterinary surgeons' widows and relatives for assistance, but as they, unfortunately for themselves, were not members of the Society, we could not grant them any. We have only had one application from a relative of a late member, and this case is now being investigated.

In accordance with a resolution passed at the last annual meeting, with regard to our nominee for free studentship at Professor Williams' College, I am sorry to report that the recipient turned out a very inattentive student, and eventually discontinued his attendance at the College. Behaviour of this kind I am sure you will all regret.

The Finance and Benevolent Sub-Committee have met during the year, and after considerable discussion advised certain alterations of rules and certain suggestions; they are on the agenda paper for discussion to-night; if passed it will give the Council discretionary powers to assist members of the veterinary profession, their widows or children, even though they be not members of the Society, and will give greater scope for the usefulness of the benevolent branch. I hope we shall have a greater influx of members during the next twelve months, and that the Society will still prosper in its good work.

The TREASURER reported: the financial year ends on December 31st, when the accounts will be audited and balance-sheet forwarded to each member. The balance in hand to present date is:—

	£	s.	d.
Defence account:			
Balance in hand	539	16	6
Subscriptions to date	85	9	0
Arrears 24 members	22	1	0
Benevolent account:			
Balance in hand..	642	13	4
Invested funds	2,800	0	0

The suggested alteration of rules were discussed, and it was resolved that they be brought forward in the usual way at the next annual meeting.

The following were elected officers for the year 1897 :—

Patron : General Sir Frederick FitzWygram, Bart., M.P.

Trustees : W. Whittle, Esq., T. Hopkin, Esq., R. S. Reynolds, Esq., John Lawson, Esq.

President : George Morgan, Esq., F.R.C.V.S., Liverpool.

Vice-President : W. A. Taylor, Esq., F.R.C.V.S., Manchester.

Treasurer : Ed. Faulkner, Esq., M.R.C.V.S., Manchester.

Honorary Secretary : Sam. Locke, Esq., M.R.C.V.S., Grosvenor Street, Oxford Street, Manchester.

Council : Messrs. A. L. Butters, M.R.C.V.S., London ; J. S. Carter, F.R.C.V.S., Bradford ; Tedbar Hopkin, F.R.C.V.S., Manchester ; H. Howse, M.R.C.V.S., Lincoln ; A. Lawson, M.R.C.V.S., Manchester ; A. W. Mason, F.R.C.V.S., Leeds ; R. S. Reynolds, M.R.C.V.S. Liverpool ; J. E. Scriven, M.R.C.V.S., Tadcaster ; R. C. Trigger, F.R.C.V.S., Newcastle-under-Lyne ; W. Williams, F.R.C.V.S., Edinburgh ; J. B. Wolstenholme, F.R.C.V.S., Manchester ; W. Woods, F.R.C.V.S., Wigan.

Auditors : Messrs. Butcher, Litton, Pownall and J. B. Wolstenholme.

Votes of thanks to the office bearers for their services for the past year, and to the president for presiding, closed the proceedings.

SAM. LOCKE, *Hon. Secretary.*

MASTER FARRIERS' ASSOCIATION.

A MEETING of the Master Farriers of Edinburgh, Leith and district was held in the Oddfellows' Hall on Tuesday evening, Mr. A. Baird, M.R.C.V.S., in the chair.

Professor W. OWEN WILLIAMS moved :—"That this meeting resolve to form an Association, to be called 'The Master Farriers' Association of Edinburgh, Leith and district,' to take cognisance of, and to secure combined action in all matters affecting their business in Edinburgh, Leith and district."

This proposal was duly seconded and unanimously adopted ; and all the gentlemen present put down their names and joined the Association.

The meeting then proceeded to the election of office bearers of the Association, when the following were elected :—President—Mr. Colin Baird ; Vice-Presidents—Messrs. Archibald Baird, R. Rutherford, A. W. Welsh, C. Grierson, J. Young, and Profesor Whitecross ; Members of Committee—Messrs. Walter Gray, John Aitkin, George Henderson, Andrew Fraser, Alexander Grant, Robert Smart, and Professor W. Owen Williams. Mr. Thomas M. Horsburgh, S.S.C., 13, South Charlotte Street, was appointed Provisional Secretary, and it was remitted to the Committee to draw up constitution and rules of the Association ; and Mr. Horsburgh was instructed to lay a draft thereof before a meeting to be held on Monday next.

Some discussion took place among the members present as to the matters of wages and prices, and it was arranged to postpone further discussion until after the constitution of the Association.

The formation of this Association is the result of demands made by the employées of the Master Farriers of Edinburgh and Leith and district for a uniform scale of wages for 1st Firemen, 2nd Firemen, and Drivers. This action has been dictated by the Trades' Union, at the request of the officials of the local Shoeing Smiths' Society, with the alternative that they come out in a body if the demands are not granted.

CONTAGIOUS DISEASES ANIMALS ACT, 1894 and 1896.

SUMMARY OF RETURNS OF OUTBREAKS, for the four weeks ending January 16th, 1897.

ENGLAND AND WALES.

Pleuro-Pneumonia.	Swine Fever.	Glanders (including Farcy).	Rabies.	Anthrax.	——
Outbreaks confirmed 1 Found diseased 4 Slaughtered, as exposed to infection 49	Outbreaks confirmed 257 Swine slaughtered diseased or exposed to infection 4421	Outbreaks reported 55 Animals attacked 73	Cases reported in dogs 16 Other Animals 1 Dogs destroyed, having been exposed to infection 12	Outbreaks reported 28 Animals attacked 51	

Glanders in London—44 outbreaks, 59 cases.

SCOTLAND.

None	Outbreaks confirmed 17 Swine slaughtered 215	Outbreaks reported 4 Animals attacked 9	None	Outbreaks reported 7 Animals attacked 9	

IRELAND.

None	Outbreaks confirmed 23 Swine slaughtered 205	None	Cases reported in dogs 32 Other animals 9 Dogs destroyed, having been exposed to infection 68	None	

PROFESSOR KOCH AND AFRICAN RINDERPEST.

THE Cape Town correspondent of the *Times* states that Professor Koch, in the course of a full report to the Cape Agricultural Department, says that bile does not contain the contagion of rinderpest, and Simpson's bacteriæ cannot be considered to be the microbe of rinderpest. All efforts to find, by means of the microscope, as well as through cultivation, a specific micro organism in the blood have as yet proved fruitless. Professor Koch is proceeding to inoculate animals other than cattle. He notes that South African rinderpest presents some differences from the disease elsewhere.

"ESCAPE OF SYNOVIA FROM ACCIDENTAL CIRCUMSTANCES."

(DELIVERED BEFORE THE MEETING OF THE ROYAL COUNTIES V.M.A. AT RED LION SQUARE.)

PROFESSOR PRITCHARD said the subject he intended to introduce to the meeting that afternoon he would designate "Some Cases of the Escape of Synovia from Accidental Circumstances." The line he proposed to take was to introduce cases of escape of synovia resulting from injury which might be, and indeed frequently were, mistaken for so-called open-joint, where the escape of synovia had taken place from different forms of the synovial membrane than that found in connection with diarthrodial joints. Synovial membrane appeared in the body in three different forms. One in connection with free-moving joints, lining the internal surface of the capsular ligament, and passing on to the margin of the articular surfaces of the bones. As in adult life, in the earlier existence of the animal the synovial membrane was spread over the whole of the articular surfaces of the joint. Another was described under the term bursa. That was absolutely a sac, sometimes spoken of as a vesicular synovial membrane; it was a form found placed between tendons or ligaments and the prominences of bones. Bursæ might be found in almost every part of the body. Perhaps he could not give them a better illustration of this form of synovial membrane than the bursa found between the prominence upon the central portion of the anterior part of the head of the humerus. Another form which he had often heard spoken of as being bursæ, was that, also a complete sac, which was found placed between either a tendon and a ligament, or between two tendons. Better examples of this he could not give them than those portions of the membrane found between the flexor tendons below the knee and hock. A good example of this arrangement found between a ligament and a tendon, was that existing between the ligament arising at the upper part of the cannon bone which joins the perforans tendon midway between the knee and fetlock. This form of synovial membrane is designated a synovial sheath. He desired his audience to bear in mind these different forms of the membrane, as much that he had to say subsequently would hinge upon these three different arrangements.

The first case he would draw upon to illustrate his subject was that of not uncommon occurrence, a flow of synovia, the result of a wound from the front of the limb in close vicinity to the fetlock joint, a discharge which had been over and over again mistaken for an open fetlock joint, and credit had been taken by the practitioner that he had brought about a closing of an open fetlock joint when really the fetlock joint had not been injured in any way or shape. What had happened there under those circumstances? They had simply got an open condition of the bursa, placed between the anterior-inferior part of the large metacarpal bone and the extensor pedis tendon, from which there might not be a very considerable flow of synovia, but sufficient to lead those who were not well acquainted with the arrangement to the conclusion that the joint was open. The case, however, compared with an open fetlock joint, was really a simple matter, because even under adverse circumstances the worst that could take place probably would be a fixture by fibrinous matter of the surface of the tendon to the surface of the bone. That might happen either to the fore limb or to the hind; and a knowledge of the position of that bursa was useful for another reason, it not unfrequently happened that there existed a dropsical enlargement of it, which was not a really serious matter, as it seldom gave rise to lameness, but the nature of the enlargement might be mistaken.

Passing a little higher up the limb we come to the cases of escape of

synovia from structures in the region of that complex joint the knee, and it became absolutely necessary that the practitioners, who have to deal with injuries in this region, should recognise the difference between an open joint and an open synovial sheath; the wound associated with the one, the former, would even under the most favourable circumstances only recover at the expense of a stiff knee, while the other would probably so heal as to simply leave a blemish. In his opinion there would be no justification in endeavouring to bring about healing in a case of open knee joint excepting in the case of an animal valuable for breeding purposes. Professor Pritchard then briefly described the anatomy of the horse's knee, pointing out that to enable the tendons to perform their functions without irritation being set up, each of them was supplied with a synovial sheath as it passed the knee. It not unfrequently happened when horses "broke their knees," for three or four days the case apparently would be doing well, but after a time a flow of synovia took place. In such the parts had not been incised at once, but had been so bruised that the sheath had sloughed, and they had partly unsheathed tendon. In a case of that kind he considered that a veterinary surgeon who, after treating a case two or three days, then got a flow of synovia, must be rather muddle-headed if he came to the conclusion that that flow of synovia came from the joint. He said that without hesitation at all, because if the wound was of such a character that the joint was opened they would get such a flow of synovia and such an exhibition of pain as to be almost unmistakeable, and it would take place very soon. Supposing the other case—that the animal fell and broke its knees, and as a result of the accident the sheath of one, two or even three of these tendons was broken. Then they would not have such a flow of synovia as they would have from the joint of the knee. But then, although the animal might be in considerable pain, and there might be some febrile disturbance and very considerable swelling, neither of them would be anything like it would be in a case where the knee itself was open.

He had rather an interesting case about three months ago in connection with an open sheath of tendon, in front of the knee in which a rather bold line of treatment was adopted. It was in an Arab mare, which had accidentally fallen while jumping, and had punctured the front of the knee with a flint. The wound was but of small size. Soon after the accident a flow of synovia took place from the wound, and the animal was placed under the care of a veterinary surgeon, who very wisely gave his opinion that the joint was not open, but that the flow was taking place from one of the sheaths of the tendons. The usual remedies in the shape of dressings, blisters, &c., were used for about two months, but the discharge continued. He (Professor Pritchard) was consulted, the veterinary surgeon having got quite tired of the case, and the animal was removed to his (the speaker's) infirmary. When it was brought in he satisfied himself at once that there was a fistula involving the sheath of the tendon. Fistulous wounds were common enough in some parts of the body, but it was not every day that they met with a case of fistula in a synovial sheath. He, however, was satisfied of it, and also that a bold line of treatment was necessary to bring about recovery; and he resolved to insert a bistoury into the sheath itself. The operation in the first instance was not successful, and consequently a second operation became necessary. Then the animal recovered at the expense of a somewhat enlarged knee only, which enlargement he thought would ultimately disappear. If any of the gentlemen present had had a case anything like that he should be very glad to hear of it.

Passing from the knee, they would now go to the stifle. He dared say they had all heard of an open stifle-joint being cured, but he believed that was absolutely an impossibility. He himself had certainly

never seen one yet. He had seen one or two cases which were said to have been cured, but in those the stifle-joint had not been opened at all. The stifle-joint was one of the largest they had in the horse's body; and there was one capsuled ligament to the whole joint. When they got that joint open, such an amount of injury must of necessity have been inflicted that not only did they get the original puncture, but also sloughing would go on to such a degree that he thought it absolutely impossible to save the life of the animal so injured, let alone to stop the flow of synovia. There were several bursæ in the immediate vicinity of the stifle-joint, from some of which a rather large amount of synovia would escape if opened, and he had little doubt that such cases had been mistaken for an open condition of the stifle itself.

There was only one other joint to which he would allude on that occasion in connection with this class of injury, and he did so because it was one, perhaps, of the most difficult to deal with, not being a large joint. There was no other joint in the whole of the horse's body which was anything like it; he referred to the joint between the condyle of the jaw and the glenoid cavity of the squamous temporal bone—a joint between two bones where the bones did not touch each other. Here a piece of cartilage absolutely separated the two bones from each other during the life of the animal. It was really a double joint, and the synovia which lubricated the underneath surface of the temporal bone did not lubricate the upper surface of the condyle of the jaw. The condition was met with generally as a consequence of the animal having been kicked and the difficulty was not on account of the size of the articulation, because the quantity of synovia in it was small, at any rate as compared with other joints, but because the jaw was scarcely ever still. There were numerous remedies, in the shape of dressings, recommended. He would, however, not dwell upon their characters or value, but would simply tell them what he considered the best application, or from which he had derived the best results. He not only considered it the dressing on account of the experience he had had in the use of it, but he thought also it was the dressing which could be received as a good one from a scientific point of view—it was the solution of bichloride of mercury. He did not believe in using it in any great strength to begin with. He should begin with the solution of the bichloride of mercury one to eight, and add one part of that to eight of tincture of myrrh, gradually increasing the strength as the case seemed to require. From practical experience, and also because the synovia was made up largely of albumen, he was of opinion no agent was more likely to give rise to a solidification of the albumen and thus to naturally plug the wound. With those few remarks he would leave the matter in their hands and he hoped to hear a discussion from which both they and he might derive some benefit.

Discussion.

Mr. WRAGG said they would all thank Professor Pritchard for so kindly and ably introducing the subject to their notice. It was a subject which, so far as he was concerned, did not bear a great amount of discussion. They all knew that when they got cases of open joint, especially in the knee joint, they were cases which very often terminated fatally. He was quite sure Professor Pritchard would not mean to go through all the joints which might be affected, but he did not mention the case of synovia from the bottom of the foot—what he once called in his hearing the coffin joint—the navicular joint. They did get those cases in London, where horses picked up nails. They were most unsatisfactory cases to deal with, because they generally terminated fatally, but he had had a case or two that had recovered. What he disliked quite as much as the stifle joint was open joint in the hock

and he thought those cases often terminated fatally. He thought he understood Professor Pritchard to say that when the injury extended to the articular surface of the bone they very seldom got recovery, and if they did it was generally accompanied by a stiff joint. When they got an escape of synovia from a joint how was it about using remedies? Unless it was a wound on the knee they did not ascertain whether it was right into the joint or whether it was only the sheath that had been punctured. He had had cases of broken knees himself, and he dared say others had, where the injury had been right into the articular surface of the joint, and there had been complete recovery and perfect use of the joint afterwards. The remedy he had employed now for some years was comprised of two or three kinds of lead; and he would give the prescription to anybody who would like to give it a trial. He had a case of injury to the hind fetlock of a mare, which was right into the joint, and about twenty-six hours after applying that lotion, which was done every two hours, coagulation or solidification took place, and the flow of synovia stopped, and although the mare was lame for a long time there was ultimately complete recovery.

The PRESIDENT thanked Professor Pritchard for his clear and lucid address, and his very apt and useful remarks about cases and treatment.

Professor PRITCHARD replied that with regard to the remarks made by Mr. Wragg, there was no doubt in the mind of any of them that the cases he had spoken of were very difficult to deal with. Like him, he had had one or two cases of navicular joint, as it was called, though it was not a joint at all. He thought the time had come when they should use terms more correctly than their forefathers did. He had had cases of recovery, but had never succeeded in bringing about a recovery in the fore foot. In the hind foot he had had recovery take place. In cases of the puncture of the hind foot, he had had more fear from the possibility of tetanus setting in than from the so-called navicular joint being punctured. He thought it would be hardly possible for the front hock to be punctured and a flow of synovia take place without the joint being involved; but this he did know, and he had seen scores of cases where the operation of dividing the ligament of the hock, in cases of spavin, with a red-hot knife, had been followed by open joint between two or more of the small bones of the hock, and he had known a score of cases where synovia had run two or three days, and the animal had ultimately recovered. Professor Hunting recently brought forward an operation for spavin. He mentioned that to show it was a fact that some of the small joints of the hock might be accidentally opened, and there might be a flow of synovia for two or three days, and then a recovery; but if anything like an opening into the joint took place, then "good-bye" to their horse. He was very much obliged to the gentlemen present for their attention that afternoon.

Mr. HURNDALL moved a vote of thanks to Professor Pritchard for so kindly attending and favouring them with an address. It was not always easy to get a gentleman to favour those meetings with a paper or an address upon any given subject, and therefore he had much pleasure in proposing that vote very heartily.

Mr. KING seconded with much pleasure. He had found the action of blisters very successful in a flow of synovia, but he would not say actually open joint.

The vote was passed by acclamation, and Professor PRITCHARD, in acknowledging the compliment, said he thoroughly agreed with the remarks of Mr. King.

BACTERIA IN AIR AND FOOD.—A MILITANT MULTITUDE.

A LECTURE of considerable interest, both to pathologists and those generally interested in matters of health, was recently delivered at the Royal Institution by Dr. A. A. Kanthack, who is lecturer on pathology at St. Bartholomew's Hospital. The lecturer had made a long series of experiments on the bacteriological condition of atmosphere and food stuffs, and many of his results are valuable for the additions they have made to our knowledge on the subject, and the popular impressions they have been the means of correcting. Treating the subject generally, Dr. Kanthack said that from the bacteriological standpoint we live amongst decomposing matter. "Without bacteria there is no decomposition or putrefaction; they reduce the organic matter to 'dust,' and with the atomised matter they are again carried away by air or water. The air, therefore, contains bacteria, the quantity being greater in windy weather than in calm, and much greater in towns than in country districts. Wherever many people congregate, the air becomes laden with dust and bacteria. It requires, therefore, but little reflection to recognise that, under ordinary conditions, the air which we breathe contains numerous bacteria. Those body cavities which are in direct communication with the outer world must also contain bacteria."

"We may, therefore, expect that the organisms which exist outside, in part at least, also find their way into these body spaces or cavities, even if they were not carried into the mouth with our food, or into the nose by the process of respiration. We cannot possibly prevent the bacteria from entering the mouth, even if we refused any but sterilised food. This is an important point to remember, because it proves the impossibility of excluding bacteria from the digestive tract. Saliva always contains them, often in great numbers; and as saliva is constantly swallowed, they must find their way into the stomach. But to return to the bacteria which we breathe. The air passages—that is, the nose, larynx, trachea, bronchi, and their ramifications, and the alveoli or air spaces of the lungs, contain bacteria. In normal respiration the inspired air enters the nose, but the anatomical structure of the latter is such as to act as a bacterial filter, imperfect, no doubt, but still capable of retaining from three-fourths to four-fifths of the bacteria of the inspired air. Therefore, although large numbers of bacteria find their way into the nasal cavities, the true mucous membrane of the nose is surprisingly poor in bacteria; and this to some extent is due to filtration, and to the fact that healthy nasal mucus possesses considerable bactericidal or disinfecting power. If, however, the nasal mucous membrane is diseased, and it is frequently diseased in this country, large numbers of organisms may be found.

"But we need not feel alarmed and insist on a sterile supply of air, because the danger of aerial infection is but slight, and because the survivors amongst the inhaled micro-organisms will remain harmless, unless the system is weakened or rudely disturbed by some interference. It is, however, well to remember that our respiratory passages may, and generally, perhaps, do contain numerous germs capable of producing disease and death, and that these germs may lie dormant there for a long time, ready under provocation to do their worst."

Referring to the matter of bacteria in food, Dr. Kanthack gives several interesting comparisons of the number of bacteria present in various germs of food. Milk, even when harmless to healthy persons, teems with bacteria.

"All cold meat contains numbers of organisms enough to frighten timid people. These are most numerous on the outside of the meat, but the interior is by no means free from them."

Oysters and cold game are also thoroughly impregnated with bacteria. Cakes and other delicacies contain more bacteria than the cheap and stale food which poor people are often obliged to buy. The result is that we habitually consume numberless micro-organisms.

"It is right and proper to avoid all dangers and risks by collecting and preparing food properly, by cooking it sufficiently, and by consuming no food that has been kept too long; but it is equally right and proper to remember that some articles of food are not only consumed, but also relished, which are known to contain enormous numbers of micro-organisms. We cannot make our lives miserable by refusing all but sterilized food; and I wish to point out to you that some articles of food which we particularly enjoy are teeming with bacteria, and for all that are not to be condemned."

The above remarks, which are extracted from a full report of the lecture in *Nature*, are of considerable interest to people who imagine that immunity from bacterial invasion may be obtained by the consumption of sterilised food only. The vital functions of the animal system cannot be performed without the aid of bacteria, and the practical conclusion to be drawn from investigations of their part in the scheme of nature, is that their action on the human body may be regarded as one for good when cleanliness and a right way of living are adopted as primary hygienic principles.

Army Veterinary Department.

Veterinary-Major J. J. Philips joined for duty at Woolwich on 8th inst.

Veterinary-Lieutenant R. H. Holmes embarked for a tour of service in India 12th inst.

Veterinary-Captain E. E. Bennett proceeded from Limerick to Cahir for temporary duty on 15th inst.

Veterinary-Lieutenants A. C. Wilson and W. S. Anthony embarked 26th inst., for a tour of service in India.

The undermentioned Veterinary officers will join for duty at Aldershot on 1st proximo:—

Veterinary-Lieutenants H. M. Lenox-Conyngham, F. H. Shore, and W. A. Pullin.

Extract from *London Gazette*, dated January 1st, 1897:—"Vet.-Lieut. T. E. W. Lewis, is seconded for service with the Egyptian Army. Dated 18th December, 1896."

"Vet.-Lieut. A. H. Lane from the seconded list, to be Vet.-Lieut. vice T. E. W. Lewis. Dated 18th December, 1896."

Vet.-Major J. J. Philips arrived from India 2nd inst., having completed his tour of service in that country.

Extract from *London Gazette*, dated January 5th, 1897. The undermentioned gentlemen to be Vet.-Lieutenants. Dated January 6th, 1897:—"H. M. Lenox-Conyngham in succession to Vet.-Major J. Hammond, retired."

"F. H. Shore, on augmentation."

"W. A. Pullin, on augmentation."

Among the Government of India list of New Year Honours, Syad Mahtah Shah, Lecturer on Anatomy, Lahore Veterinary College, to be Khan Sahid. The recipient of this much-valued honour is the author of a work in the Urdu language on veterinary anatomy, that is used as a text-book in the vernacular veterinary schools and colleges in India.

Extracts from Foreign Journals.

ON THE FUNCTIONS OF A BUCCAL ORGAN IN THE FŒTUS OF THE HORSE.

M. HARTENSTEIN draws the attention of *La Société Centrale de Médecine Vétérinaire* to the existence in the buccal cavity of the foal, during the latter portion of its fœtal life, of a special organ. He says, "At a given moment in the intra-uterine life of the foal, and, perhaps, of all the solipeds, the creature is furnished with an organ—a kind of natural feeding-bottle—which serves to strain, to a certain extent, the serosities of the allantoid, so as to allow only the nutritive principles to pass, the fœtus thus living not only by the umbilical circulation but also by the liquids which it absorbs." "This organ," continues M. Hartenstein, "exists constantly. In the case of hurried parturition the foal has it still within his jaws; otherwise, he has let it go only a few instants before; and in that case, we find it always in the fœtal envelopes. Sometimes, however, the foal swallows this organ, after having crushed it between his teeth." The organ is kidney-shaped, about 4 in. long by 2½ in. broad, spongy in texture, red-brown in colour, somewhat frail, has an ill-defined cavity, contains pretty often transparent crystals (urates of potassium or soda), and decomposes quickly when exposed to the air. M. Hartenstein wishes to establish a relationship between this buccal spleen, as it is called in the breeding world, and the *hippomanes* of Bourgelat, Lecoq, and Goubaux, which, we know, are sometimes free, sometimes adherent, and are pediculated (or, in other words, they float in the allantoid liquid, or are suspended from the internal face of the allantoid). He thinks that these *hippomanes* are caused by the sucking of the foal in the wall of its membranous envelope. M. Moussu, on the other hand, thinks that this organ is merely a muco-albuminous plug formed in the mouth and pharynx of the fœtus, destitute of all organization, and presenting two strata (the one cortical and the other medullary) which are, however, in reality only muco-albuminous strata super-imposed in the centre and crowded together in the periphery. M. Moussu adds that he considers this muco-albuminous plug (which must be carefully removed at birth, if still persistent in the back part of the mouth of the young animal) to be a protective apparatus, a useful obstruction preventing all communication between the amniotic cavity and the *back of the pharynx.—Annales de Médecine Vétérinaire.*

THE HORSE-POPULATION OF FRANCE AND GERMANY.

FRANCE possesses nearly three millions of horses, of a total value of £54,500,000 or thereabouts. This is rather below Germany, which possesses half a million more, but the proportion per acre and per inhabitant is slightly to the advantage of France. In Germany there are 7·5 horses per inhabitant; in France nearly 8. The French equine population embraces 700,000 to 800,000 horses employed in the service of towns, and 140,000 to 150,000 in the army. The remainder are employed in agriculture. In examining the most recent statistics published by the Ministry of Agriculture, one is struck with the fact that the urban population tends incessantly to increase, and that in a proportion more rapid than the human population of the towns. No doubt this is owing to the increase of the means of transport and their growing cheapness. With regard to Paris, its equine population, which was 70,000 in 1870, is now 120,000. To give the reader an idea of the work performed by the Parisian horses we need only say that, taking the number of miles they travel, they perform the circuit of the globe two and a-half times daily.—*Ibid.*

ACUTE INFECTIOUS KERATITIS, OR INFLAMMATION OF THE CORNEA.

In August, 1895, I saw, for the first time, the above-mentioned disease make its appearance in the herds of cattle belonging to a large proprietor in this country. The herd consisted of about 200 head, and happened to be out at grass during the examination. The infected animals startled me at once by this peculiarity, that they had almost always one eye (this is in direct contrariety to the observations of Professor Möller), and less often, two, closed. Moreover the outer surface of the eyelids and the hair on the affected side of the face were damp. If the eyelids of the animals were opened by means of the thumb and the middle finger, one saw in the different individuals the various symptoms as they appeared in the course of the illness. In some at the beginning of the illness there existed a simple conjunctivitis catarrhalis or purulenta, with others it was already keratitis superficialis or parenchymatosa, even to the formation of an abscess in the cornea along with the first-mentioned symptoms. Their condition later on also corresponded roughly with these anatomical symptoms, so that with some only photophobia and a somewhat stronger delachrymation was evident, with others it was a serous and slimy secretion in the conjunctival sac, while with a third lot on the contrary, the secretion was purulent. From these secretions proceeded also the moistness on the eyelids as well as on the cheeks. With some animals the cornea was still quite clear, with others it was already greyish-blue, in order, finally, in the further course of the disease, to become almost milk-white. With such animals as those in whose cornea an abscess had already formed, there had appeared so strong a vascularity, especially on the rim of the cornea, that the latter looked as if enclosed by a red ring. In one animal panophthalmitis had already appeared; here the eye was lost. An examination with the ophthalmoscope could not be undertaken, as, at each attempt, the animals drew back the eyeball deep in the socket, and showed themselves very refractory on account of the pain.

Soon after, in the same month, I saw the disease appear in the cattle of another owner. The two estates joined. Here also, in the different animals, the symptoms already described were seen in the course of the disease. The treatment of both herds was as follows:—The diseased animals were immediately separated from the sound ones, and taken from the pastures to the stalls. Here the eyes were washed three times a day with lukewarm water, and then each time a one per cent. solution of chloride of calcium was injected by means of a pipette into the conjunctival sac.

The red precipitate ointment was applied to those animals whose cornea was covered with a whitish film. Where an abscess had formed in the cornea I applied ichthyol. Under this treatment, those animals which at the beginning of the treatment were in the first stages of the disease, had entirely recovered in five or six days. In the more serious cases it took about fourteen days for the animals to recover. In five weeks the whole lot of them had recovered, including those that had had the disease last.

Altogether about 80 per cent of the total number of beasts in both flocks had been attacked, and the whole lot of them were well again. The only exception was the one animal in which panophthalmitis with the resultant conditions had appeared before it could be attended to. If the diseased animals were left unattended to and remained out at pasture, the disease made rapid progress, On the other hand, if they were attended to, but left out in the fields, they recovered all right; but it took them much longer than those which had been brought into their stalls. The summer of 1895, and more especially at that time, was very sultry, and the fields were, consequently, very dusty.

In the summer of 1896 the disease took a much wider sweep in my district. I alone had an opportunity of observing this disease in July and August, in five large herds. The total number of beasts in these herds was, in round numbers, about 1000. In addition, however, the disease appeared in many other places in which I had not the opportunity to study it myself. Here, also, the symptoms were exactly similar to those I had remarked in the diseased animals in the summer of 1895. A long spell of hot dry weather prevailed also in July and August of 1896, and accordingly the healing of the sick animals progressed much more quickly in the dark airy stalls than it would have done had the animals been attended to out at pasture. I had so far changed the manner of treatment this summer that I first cleaned the eyes with a 2 per cent. solution of boron water, and then disinfected them with a solution of chloride of calcium. Before I had recognised the disease as acute infectious keratitis, I had blamed the dry dust coupled with the piercing rays of the sun, as the cause of the disease. I soon had my attention drawn to the infectious character of the disease by the fact that it went hither and thither from one estate to another, and almost always confined itself to those which had any intercourse with each other. Thus, there were many districts which remained quite free from the plague, principally on account of the fact that they had no intercourse with the others. Therefore, although the infectious character of the disease is proved, yet I do not think it permissible to dismiss the dry heat and the dust connected therewith as contributary causes, without further ado. Perhaps an irritation of the conjunctiva is produced by the dust, so that the contagion acts on the mucous membrane when thus irritated more rapidly than on the conjunctiva when perfectly sound. Perhaps, also, the contagion can only increase in a dry heat. At any rate, it was proved distinctly that cattle became well very much more quickly in the dark stall, than in the open air where they were exposed to the dust and the rays of the sun. It has not been possible, so far, to undertake a microscopic examination of the secretion, or of the diseased membrane.

This summer, I had also frequent opportunities of studying cases of conjunctivitis or keratitis in horses. Yet, I could not accept the same cause of the disease for horses as for cattle, since just in those estates in which some of the cattle were diseased, the horses remained unharmed. There existed, simultaneously, in the horses thus affected, an erythema on the white uncoloured parts of the skin, which I did not think was erythema solare. This inflammation of the skin was often so violent, that the epidermis came off altogether, and the hair fell out. The owners indicated mildew, which that year had attacked the green food to a large extent, as the cause of the dermatitis. Coming back, however, to the acute infectious keratitis, I have never witnessed a case of the transmission of the disease to man. Although, therefore, a physician in this part of the country pretends to have observed among his patients, during the time of the outbreak, affections of the eyes which were similar in character, I can say that I have never seen a case of this same illness in the people who were engaged in attending to the diseased animals.—Veterinary-Surgeon Marder in the *Berliner Thier. Woch.*

PULMONARY EMPHYSEMA IN THE HORSE.

For some time past, all veterinary journals, and a great number of agricultural journals, have been speaking of a new treatment of broken-wind by horse-chestnuts. Several French practitioners have reported perfectly favourable results obtained by the use of these chestnuts. The reading of these reports recalled an old remedy which I have since applied with perfect success. The first horse I had to treat in this new-old way was an Irish

gelding, 12 years old, which for a long time back had been so broken-winded, that it was almost useless for work, and, in fact, had been condemned by its owner. When I first saw the animal it had just been unyoked, and was in a pitiable condition; its nostrils were widely dilated, respiration was terribly accelerated, and there was a dry, feverish cough. The cracking sound perceived on auscultation of the chest, and the wide resonance following on percussion, completed the symptomatic picture of pulmonary emphysema arrived at the last stage. I adopted the following treatment, in the hope rather of mitigating the symptoms than of curing the disease. For a period of 15 days I administered daily arsenious acid in progressive doses, but without any result. Then I administered twice daily, morning and evening, in half a litre of bitter beer, the following dose :—

Arseniate of Strychnine	3 centigr.
Arseniate of Iron	25 „
Iodide of Potassium	2 grammes.

At the same time, I had the horse frequently rubbed down with wisps of straw dipped in vinegar or alcohol. A distinct improvement soon made itself apparent, and at the end of eight days the animal could be yoked for short journeys. Encouraged by this unexpected result, I continued the treatment and obtained a complete cure in two months. Arseniate of strychnine is the most powerful and certain drug for giving to the nervous system the strength necessary for the support of all the organs during the continuance of morbid affections. In small doses it regulates respiration and facilitates hæmatosis or blood-formation. Arseniate of iron, the acknowledged re-constituent of the blood, seemed to me to be demanded by the paleness of the conjunctivæ. I added iodide of potassium to regulate the circulation. I may state that I have since treated a second horse affected in the same way, and with complete success. –G. Geudens in *Annales de Méd. Vét.*

TUBERCULOSIS OF THE SUBCUTANEOUS CELLULAR TISSUE AND OF THE MUSCLES IN A BULLOCK.

The subject of this note was a bullock, two years old, whose appetite had become irregular, and which kept on coughing from time to time. It became emaciated, and presented beneath the skin little hard knots of the size of a pea, and adhering to the subjacent tissues; a few were to be found everywhere, but they were specially abundant in the fold of the dew-lap and at the base of the tail—this latter being, in fact, quite knotty Although there were no thoracic symptoms, I ordered the animal to be slaughtered for tuberculosis, and at the *post-mortem* I observed the following lesions: the lungs and the bronchial, mediastinal and sublingual ganglions presented tuberculous esions; in addition to this, the superficial muscles of the thighs, axilla, forearms, etc., were covered with tubercles, the majority of which were situated superficially in contact with the aponeuroses in the cellular tissue, whilst others were enclosed in the thickness of the muscle. The majority of these wandering tubercles had a caseous or caseo-calcareous centre. We all know that the Koch bacillus can fix itself in nearly all the tissues of the body: clinical observations, aided by the microscope or by experiment, are instructing us gradually in this matter. Quite recently several veterinary authors have reported cases of nervous tuberculosis, and shown that these localisations are more frequent than is commonly supposed. Cases of tuberculosis of the subcutaneous conjunctive tissue are less frequent, but a few have been reported, and surgeons have even noted cutaneous ulcerations due to this disease.—Veterinary-Surgeon Hanozet in *Ann. de Méd. Vét.*

MANGE TRANSMITTED FROM THE DOG TO MAN.

Mr. E. B. Gravenhorst, writing to the *Tjdschrift voor Veeartsenijkunde*, tells that he received as a present a young fox-terrier, four weeks old, and noticed that the little animal was tormented with severe itchings, although its skin presented nothing that was abnormal. The little creature being very sensitive to cold, the writer sometimes took it into his bed in the morning. In a short time he also began to experience itching in his arms and legs, and later on he noticed the presence of small knots. Microscopic examination showed that the owner, as well as the dog itself, was suffering from mange; in the latter also a few knots had now begun to appear. The dog grew rapidly better by means of creolin washes, and the owner by means of applications of balm of Peru.

Notes and News.

THE DUKE OF SUTHERLAND has granted the use of Stafford House for the annual meeting of the Church Society for the Promotion of Kindness to Animals, to be held on Thursday, April 29th.

THE PASTEUR INSTITUTE.—The returns of the work done at the Pasteur Institute during the quarter ending June 30th, as published in the last issue of the *Annales de l'Institut Pasteur*, state that in the course of April, May, and June, the total number of persons under treatment was 316, of whom only 23 were foreigners, and that of this total 11 had been bitten by animals experimentally proved to be mad, 174 by animals only suspected of being so, the bites having been inflicted in 273 cases by dogs, in 39 cases by cats, in two cases by cattle, and in one each by a jackal and a pig. No fewer than six deaths, some of which occurred earlier in the year, of persons who had been under treatment were reported during this period, the first being that of Thomas Oppenshaw, Bury, Lancashire, who had been bitten badly on the two hands in November, 1895, and had been under treatment from November 22 to December 3. He died on January 16, 1896, and the dog which had bitten him was certified to be mad. The second case was that of Joseph Aveggar, a Swiss lad of twenty, who was bitten very badly on the nose and upper lip on October 20th, 1895, and was under treatment at the Pasteur Institute from October 28 to November 17. He died of hydrophobia in January, 1896, and the dog which had bitten him was declared to be mad by M. Wandel, veterinary surgeon at Lucerne. Joseph Aveggar was unfortunately given to drink, and was frequently in a state of intoxication while under treatment. The third case was that of Thomas Lambert, aged 19, of Stockport, who was bitten on March 3, and was at the Pasteur Institute from March 8 to 26, dying on April 21. He was badly bitten on the arm in four places, and two guinea-pigs, which had been inoculated with the virus of the dog which had bitten him, died of hydrophobia. The fourth death was that of Louise Lasalle, aged 28 months, of Pomarez, in the department of Landes, who was bitten on October 16, 1895, treated at the Pasteur Institute from October 19 to November 5, and died April 4, having been bitten in three places in the right arm and hand. The fifth death was that of Victor Barimbordes, aged 12 years, of Navarreux, in the Basses Pyrenées, who was bitten on April 5 by a dog which had been declared mad when a *post-mortem* examination was made of him, while Barimbordes, who had two deep bites on the right foot, which were cauterised half-an-hour afterwards, went to the Pasteur Institute for treatment from April 9 to 26. He was seized with symptoms of hydrophobia on June 17th, and died on the 20th. The sixth case

was that of Leon Cros, aged 26 months, of Béziers, who was only bitten on July 19th, and was under treatment at the Pasteur Institute from July 25th to August 11th, symptoms of hydrophobia declaring themselves on August 25th, and the child dying on the 28th. He had been bitten in two places on the left leg, through a woollen stocking, and the dog which inflicted the bites had been declared mad by M. Gilis, veterinary surgeon at Béziers.

THE NEW METHOD OF CATTLE KILLING IN EDINBURGH.—The subject of the adoption of a more humane method than the present of killing cattle was recently brought before the Town Council by Councillor Williams, Principal of the New Veterinary College. Having been sent to the Markets Committee the matter has since been under their consideration, and yesterday afternoon they visited the slaughterhouses in Fountainbridge to witness "Greener's Humane Cattle Killer" in operation, it being claimed that the instrument employed "is perfectly safe and sure in its action, and kills instantaneously." The invention, which is a practically noiseless explosive apparatus, consists of a short rifled barrel chambered to receive a small cartridge with steel-pointed bullet. It is terminated by a bell-shaped chamber, which serves to deaden the sound to protect the operator from the flash of the explosion, and to direct the bullet through the brain into the spinal cord, thus avoiding the necessity of pithing. The animal, it is further pointed out, is killed instantly, and can be bled without danger at once. This method, it is likewise affirmed, in no way affects the flavour of the meat. A considerable number of spectators, including various members of the Markets Committee, and a considerable representation of the master butcher trade, witnessed the experiment, which, conducted by Mr. Durie, the superintendent of the slaughterhouses, was in all respects satisfactory. An ox, having been secured against the wall, was operated on, and instantly the instrument had been fired it fell dead. All who witnessed the experiment seemed eminently pleased with it, some, however, being of opinion that it would be well if the instrument had a somewhat longer barrel, so that restive animals, and those having long horns, could be all the more safely dealt with. Bailie Gulland, Convener of the Markets Committee, suggested that he was sure the company were thoroughly satisfied with what they had seen, and observed that, of course, it lay very much with the butchers themselves whether the instrument should be brought into anything like general use. In any case, he said, it would require to be employed with great care. Mr. Durie, it may be mentioned, has been successfully experimenting with the instrument for a considerable time.

THE SLAUGHTER-HOUSE QUESTION.—The President of the Board of Agriculture will receive a joint deputation of the Church Society for the Promotion of Kindness to Animals and the Church Sanitary Association, asking for further legislation respecting slaughter-houses, on Thursday, February 25th. The Duke of Westminster will head the deputation. Copies of the Memorial, which has already been signed by nearly 4,000 persons, can be had on application to Mr. W. P. Gledhill, Church House, Westminster, S.W.

Obituary.

Case, Frederick, Swaffham, Norfolk, April, 1873 (per *Registrar*).
Creswell, Edward, Bromsgrove, Worcestershire, April, 1864 (per *Veterinary Record*).
Pattison, Henry A., Cape Town, South Africa, May, 1892 (per *Veterinary Record*).

Reviews.

THE SHEEP: ITS EXTERNAL AND INTERNAL ORGANIZATION. By A. SEYFFERTH. Revised and edited by PROFESSOR G. T. BROWN, C.B. (London: George Philip & Son. 3s. 6d. nett.)

Messrs. Philips' series of "Anatomical Models" of the domestic animals will be familiar to our readers from those of the horse and ox, which have already appeared. Each "model" comprises "a brief description" of the anatomy of the animal treated of, and an "illustrated representation," *i.e.*, a view of the chief structures and organs arranged in superimposed and movable plates.

The work at present under review is uniform in get-up with those of the same series which have gone before.

The text, or "brief description," as it is called, is, in this instance, a signal failure. The author has tried to do too much in the way of rendering his anatomical description popular and understandable by the lay mind. In doing so he has treated us to a strange mixture of platitudes and technical details. An example will make our meaning clear. ". . . the hair has no blood-vessels or nerves, *and can, therefore, be painlessly cut off*"; we should have thought that childhood's first visit to the barber—or shall we call him the tonsorial artist—would have been sufficient to enlighten us on this point. Again, we are told that "the sense of smell is located in the nose; of sight, in the eyes; of hearing, in the ears." Only this, and nothing more. Perhaps the author is afraid that we may fancy that the physiology and anatomy of the sheep are very different from our own. On the other hand, we are informed that, "in the voluntary muscles, the fibres are marked by transverse lines (striæ)," without being told that a microscope, and a powerful one at that, is necessary to see these striæ; so that, if we knew no better, we might look for them with the naked eye—and be terribly disappointed. There are other instances, but the foregoing will serve to show that the lay reader—and the work is obviously intended for such—is treated to knowledge of a very unsatisfactory kind.

Then the statements are very imperfect, or rather they set out to be comprehensive and fall lamentably short. As, for instance, in the classification of bones, where the important class of irregular bones is omitted; in enumeration of the bones of the brain cavity, or, as he also calls it, the skull, the sphenoid finds no place; the upper row of carpal bones are named—after a fashion—but bones of the lower row go without mention. The upper carpal bones, by the way, are called "the unciform bone, the polygonal bone, the cuneiform bone, and the cuboid bone." We hardly think this nomenclature would meet with the approval of British anatomists. Here is a curious statement, calculated to unhinge the average mind: ". . . . the shank-bone, (*i.e.*, the metacarpal bone), "which is not connected with joints with the *rudimentary collar bones*." We should hope not, indeed. But, observe: "From the shank-bone, to which the collar-bone is only fastened by a small, round little bone, the arrangement of the foot is the same as on the fore-limbs." Surely someone has blundered.

What is the meaning of this? "Here the salivary glands step in, and in ruminants, the fermentation contained in the saliva, promoting digestion, is mixed with the food." No doubt it is all right, but it needs straightening out, if the lay mind is to make anything of it.

Here is a curious and, so far as we know, hitherto unheard of function for the female sexual organs. "The female sexual organs consist of organs for the development of the ovum, the embryo, the ovaries, Fallopian tubes (the oviparous ducts), and the womb or uterus."

We have no doubt our chemist friends will be able to understand what is meant by "carbonic acid lime," "carbonic-hydrates," and "lacteal acid."

Evidently the translator and proof-reader have both been at fault, and it seems rather a pity that Professor Brown's name should be associated with a work so crowded with mis-statements and printer's errors.

The section on dentition is the best in the book, and has evidently emanated from Professor Brown himself. It is illustrated with cuts from the pamphlet of that authority on the dentition of farm animals.

For the plates we have little but praise; they are executed in an ingenious and clear manner: but again we would suggest to Messrs. Philip that simple paper is hardly durable enough a material for the purpose. The movable portions must be handled with considerable care, or they leave their attachments. Surely it would be worth while, and would not greatly add to the cost of production, to use calico, or something similar, for the purpose of mounting the figures.

Taking the book as a whole, we think the veterinary surgeon and student might do worse than purchase a copy, especially if he makes up his mind to omit the first part, or merely read it as a recreation. The cost is certainly not prohibitive or extortionate, even if we value the plates alone.

Correspondence.

DEGRADATION

SIR—It appears, from the enclosed cutting from the *Lancet*, that ours is not the only profession some of whose members compelled, shall we say, by the exigencies of a struggle for existenee, which is yearly getting more accentuated, do things that are hardly creditable to the calling to which they belong. "Veneral" is awful.—Yours, JONES.

THE DEGRADATION OF THE PROFESSION.

"Is there nothing that can be done to prevent such a great lowering of our grand profession?" writes a correspondent, who encloses the following handbill:—

LLANHILLETH WORKMEN'S
DOCTOR'S QUESTION.
The benefits derived by the Workmen by Paying
THREEPENCE
IN THE POUND.

1. A Resident Doctor in Crumlin, and Surgery twice a day there, instead of once as at present.
2. To attend to Confinements Free.
3. Veneral (*sic*) Diseases attended to Free.
4. Examinations Free.
5. Certificates for Clubs Free.
6. School Certificates when necessary.
7. Supply of Salts, Senna, Pills, Plaisters, Castor Oil, Bandages, Splints, and Teeth Drawing.
8. Cod Civer Oil.

Communications, Books, Journals, etc., Received.

American Veterinary Review; Journal of Comparative Medicine; Australian Farm and Home; Results of Use of Tuberculin, by James Wilson, M.A.; Bacteriological Diagnosis, by St. John Reid; Recueil de Médecine Vétérinaire (Alfort); La Presse Vétérinaire (Paris); L'Echo Vétérinaire (Liége); Annales de Médecine Vétérinaire (Brussels); Berliner Thierärztliche Wochenschrift (Berlin); La Clinica Veterinaria (Milan); Il Nuovo Ercolani (Pisa); La Revista Veterinaria (Buenos Aires); Deutsche Thierärztliche Wochenschrift (Hannover und Karlsruhe).